AVIATION WEEK
A McGRAW-HILL PUBLICATION
OCT. 25, 1948

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L-M–Bartow

high intensity approach and runway lights

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All over the world!

L-M—Bartow pioneered high intensity lighting, and is today's leader both in quality and number of installations. The list shows some recent users of L-M—Bartow high intensity systems. Only the fully controllable beam permits the very high controlled intensities, up to 180,000 beam candlepower. This gives maximum penetration, *without glare*, reaching out further to "bring 'em in alive" when every foot of distance counts. For information on this and other engineered lighting for all sizes of airports wire or write Airport Lighting Division, Line Material Co., East Stroudsburg, Pennsylvania.

LM

LINE MATERIAL Airport Lighting

AIRCRAFT BALLASTS

for the "last word" in fluorescent lighting

The newest in decorative lighting today is the 12-inch, 32-watt circline lamp. Thanks to new General Electric 400-cycle ballasts, this lamp and other recently developed fluorescents can now be installed in aircraft—with assurance of full rated life and full light output.

Compact, light, and reliable, G-E ballasts cover all transformer requirements for aircraft fluorescent lighting. They are available in high-power-factor designs for one, two or more lamps—from 4 to 40 watts. Where space and weight are particularly important, a small vest-pocket-size ballast of the core and coil type, uncorrected power factor, is available—with weights of only 1¾ to 4¼ ounces.

General Electric's new bulletin, GEA-4866, lists various standard aircraft ballasts and also other G-E aircraft transformers. You should have this catalog in your files. For a copy, and for assistance with any aircraft transformer problem, get in touch with your G-E sales office or write *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

411-31

Transformers for Aircraft

Among General Electric aircraft transformers are the following:

- Ballasts for fluorescent lighting
- Ignition transformers for cabin heaters, wing de-icers
- Ignition transformers for jet engines
- Phase-changing transformers
- General-purpose transformers
- General-purpose "flyweight" silicone transformers

All General Electric aircraft transformers are designed to:

- Give dependable operation at altitudes up to 50,000 feet
- Operate in ambient temperatures from —70 C to 71 C
- Tolerate normal frequency variations in power supply
- Withstand vibration and shock
- Keep weight and size to a minimum

TECHNOLOGY DEPARTMENT
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OCT 25 1948
DETROIT

He's giving orders for an engine fire!

He *deliberately* sets plane engines ablaze!

From the cockpit section of our pulled-apart B-26, he pushes the switch that makes flames roar out from the aft engine of a tandem power-plant arrangement. Meanwhile the blast of the front engine's propeller simulates the slipstream of high-speed flight.

Then, at the touch of a control handle, he smothers the blaze as the extinguishing system goes into action!

At the Kidde proving grounds, we've started more than 600 fires like that—under conditions that reproduce actual flight. We've set more than 1100 additional fires in engine mock-ups. We've held stop-watches as those fires died—killed by a blast of carbon dioxide (CO_2) or methyl bromide. Or perhaps the extinguishing agent was monochlorobromethane (CB), dachlaurin (DL), or one of the Freons. We've put them all to the test.

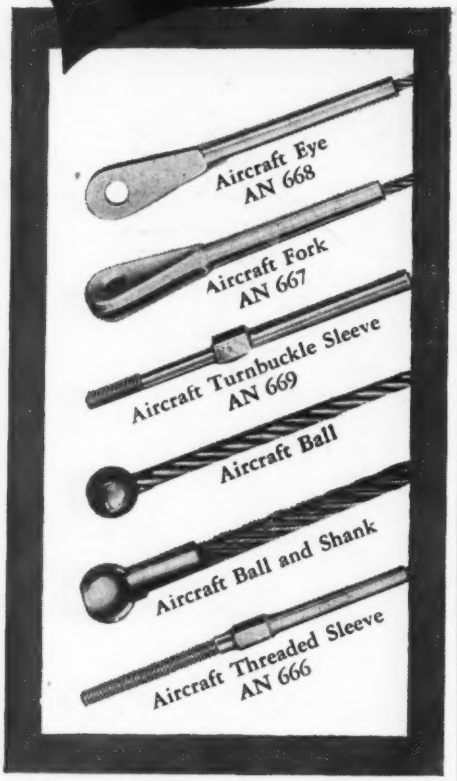
It's all part of the continuing program of Kidde research directed toward greater safety aloft. Through studies like this, we have collected a fund of information unmatched by any other private organization—information which is always at the disposal of government agencies, aircraft manufacturers and transport companies.

The words "Kidde" and the Kidde seal are trade-marks of Walter Kidde & Company, Inc.

Kidde

Walter Kidde & Company, Inc., 1018 Main St., Belleville 9, N. J.

lightweight, compact, full strength ASSEMBLIES


Aircraft Eye AN 668
Aircraft Fork AN 667
Aircraft Turnbuckle Sleeve AN 669
Aircraft Ball
Aircraft Ball and Shank
Aircraft Threaded Sleeve AN 666

SWAGED TERMINALS are your lightest, most compact attachments for aircraft controls—and give you full catalog strength of the cord. Besides that, assemblies of Roebling Swaged Terminals and Roebling Aircord—cord with almost no constructional stretch—practically eliminate the need for repeated adjustments.

Roebling supplies complete aircraft control assemblies ready for installation, and manufactures a full line of swaged terminals. Write for Booklet A-902 describing the whole range of Roebling products for aviation.

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A CENTURY OF CONFIDENCE

Vol. 49, No. 17

AVIATION WEEK

October 25, 1948

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Executive and Editorial Offices: 330 W. 42d St., New York 18, N. Y., Phone Longacre 4-3035; National Press Bldg., Washington 4, D.C., Phone National 3414.

Domestic News Bureau: Atlanta 3, Rhodes-Haverty Bldg.; Chicago 11, 520 N. Michigan Ave.; Cleveland 15, Hanna Bldg.; Detroit 26, Penobscot Bldg.; Los Angeles 14, 621 S. Hope St.; San Francisco 4, 68 Post St.; Houston, 514 South St. *Correspondents:* Boston, Buffalo, Dallas, Dayton, Denver, Indianapolis, Jacksonville, Kansas City, Knoxville, Lansing, Louisville, Memphis, Miami, Milwaukee, New Orleans, Oklahoma City, Ogden, Philadelphia, Phoenix, Pittsburgh, Portland (Ore.), St. Louis, Salt Lake City, Seattle, Wichita and 43 other cities.

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McGRAW-HILL PUBLISHING CO., Inc., James H. McGraw (1860-1948), Founder. Publishing Office, 99-129 N. Broadway, Albany, N. Y. Editorial and executive offices: 330 W. 42nd St., New York 18; 520 N. Michigan Ave., Chicago 11; 68 Post St., San Francisco 4; Aldwych House, London, W.C. 2; National Press Bldg., Washington 4, D. C.; Architects Bldg., 17th & Sansome Sts., Philadelphia 3; Hanna Bldg., Cleveland 15; 2980 Penobscot Bldg., Detroit 26; Continental Bldg., St. Louis 8; 1427 Statler Bldg., Boston 16; Rhodes-Haverty Bldg., Atlanta 3; 621 South Hope St., Los Angeles 14; 738-39 Oliver Bldg., Pittsburgh 22. JAMES H. McGRAW, Jr., President; CURTIS W. McGRAW, Vice-President and Treasurer; EUGENE DUFFIELD, Executive Assistant for Publications; NELSON BOND, Director of Advertising; JOSEPH A. GERARDI, Secretary; J. F. BLACKBURN, Jr., Director of Circulation . . . Aviation Week, 330 W. 42nd St., New York 18. Published weekly, price 50¢ a copy, 50¢ in Canada. Allow at least ten days for change of address. Address all communications about subscriptions to Director of Circulation, 330 W. 42nd St., New York 18, N. Y. Subscription rates—United States and possessions, $5 a year, $8 for 2 yr., $10 for 3 yr. Canada, $6 for 1 yr., $10 for 2 yr., $12 for 3 yr., payable in Canadian currency at par. Pan American countries, $16 for one yr., $16 for 2 yr., $20 for 3 yr. All other countries, $20 for 1 yr., $30 for 2 yr., $40 for 3 yr. Please indicate position and company connection on all subscription orders. Entered as second class matter July 16, 1947, at Post Office, Albany, N. Y., under Act of March 3, 1879. Volume 49, Number 17. Printed in U.S.A. Cable address "McGraw-Hill New York." Member A.B.C.

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Aviation Week is indexed in "Reader's Guide to Periodical Literature" and in "Industrial Arts Index." Following publications are combined with AVIATION WEEK: AVIATION, AVIATION NEWS, AIR TRANSPORT, AERONAUTICAL ENGINEERING and AIRCRAFT JOURNAL.

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PRELUDE TO SURVIVAL

Forty-five years ago at Kitty Hawk . . . Orville Wright soared aloft . . . to make mankind's oldest dream of heavier-than-air flight . . . an accomplished fact. ¶ Despite a complacent belief that this scientific achievement heralded an era of expanding friendship among the peoples of the earth . . . time has shown that in ruthless hands the airplane can be a frightful instrument of aggression. ¶ Only three years after World War II . . . and just a year after the Air Force has commemorated its first anniversary of autonomous operation . . . there is abundant evidence that maintenance of a dominant American air power is a vital factor in discouraging aggressor nations. Republic joins with the USAF in committing our entire resources to this end.

AIR POWER US A F IS PEACE POWER

Republic built the P-47 Thunderbolt, used on all fronts by the air forces of the Allied Nations in World War II . . . It is still flown by our Air Force and our National Guard . . . and we are now concentrating full production on the 600 MPH F-84 Thunderjet. ¶ Several hundred of these are in daily service with USAF groups throughout the country, meanwhile, development continues on faster, longer-range aircraft destined to probe new areas of performance. . Republic Aviation Corp., Farmingdale, L.I., N.Y.

"This is the year of the Thunderjet"

REPUBLIC AVIATION

Makers of the Mighty Thunderbolt • Thunderjet • XR-12

CONTINENTAL AIRLINES INAUGURATES CONVAIRLINER SERVICE. Five of these new 40-passenger Consolidated Convair 240's are scheduled to go into operation this fall. Ships utilize auxiliary jet exhaust propulsion which permits closer cowling, higher speeds, and better engine cooling. Each engine's exhaust feeds into a venturi, builds up 135 lbs. of jet thrust at 8,000 ft. Cabins are sound-insulated. *Continental Airlines uses Texaco Aircraft Engine Oil and other aviation lubricants exclusively . . . has done so for 11 years!*

ROBERT F. SIX, President, has headed Continental Airlines since its inception. Continental operates into 27 cities in six Western states, carries some 15,000 passengers a month, and has one of aviation's most outstanding safety records.

CONFIDENCE

. . . looms big behind the use of Texaco Aviation Products and Lubrication Engineering Service

MORE revenue airline miles in the United States are flown with Texaco Aircraft Engine Oil than with any other brand! There, in just twenty words, you have the story of airline confidence in Texaco.

Nowhere is dependability more important than in aviation . . . dependability of quality in lubricants and fuels . . . dependability of deliveries . . . dependability of service. Texaco is reliable on every count.

Operators using Texaco will tell you, also, that there is real economy in the use of Texaco Aviation Products and Lubrication Engineering Service . . . the economy that comes from more trouble-free operation and reduced maintenance costs.

Learn how Texaco can help *you* increase efficiency and economy. Just call the nearest of the more than 2300 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, *Aviation Division,* 135 East 42nd Street, New York 17, N. Y.

TEXACO Lubricants and Fuels
FOR THE AVIATION INDUSTRY

Tune in . . . TEXACO STAR THEATRE every Wednesday night starring Milton Berle. See newspaper for time and station.

Propulsion Grab Bag

When Claude Ryan sat down in 1926 to design an airplane capable of flying the Atlantic for youthful Charles Lindbergh, there was one problem he did not have to solve: power plant selection. This happy situation existed because the 225 hp. Wright J-5 Whirlwind was the only power plant in its class then available.

With this as a starting point, the remainder of the airplane fell almost automatically into place. Designers continued to produce aircraft based on such simplified power plant selection until World War II—and then came Frank Whittle's aircraft gas turbine.

Today, the designers spends as much of his study time evaluating power plant-aircraft combinations as he used to spend in the preliminary design of the airplane itself. In addition to a dozen basic engine types, there are seemingly infinite variations and combinations of engines and components available to bedevil the airframe designer.

But as though this complex situation was not enough, propulsion research and development is continually changing the power plant spectrum through quick improvements in some types and inordinately slow improvements in others. As a result, the range of available power plants has become a veritable "grab bag" into which the hopeful designer thrusts his hand with only a hazy idea of what it will bring forth.

Technical Battle

This complex situation is a tribute to the engine industry. One of the great historic technical races has been the see-saw battle between airframe and engine manufacturers. First we had early aircraft which were seriously underpowered. Then came World War I engine developments at McCook Field that produced engines far too powerful for existing aircraft, with the exception of record-breaking special racing types.

In the 'thirties the battle swung the other way with such giants as the Boeing B-15 and Douglas B-19 demanding power far in excess of anything available. But World War II, as did the previous war, swung the pendulum back with engines considerably more powerful than airframes could accommodate.

To weave his way through this maze, the designer has fashioned one simple yardstick to measure the myriad advantages and failings of each power plant type: design cruising speed of the airplane. Into the study must go considerations of altitude, range and useful load but the main avenue of approach is simply the question: "How fast?".

By erecting this floor under his calculations, all the variations in efficiencies, specific weight, frontal area, etc. are miraculously supported. And on this altar of speed the reciprocating engine, regardless of its many new ramifications, must eventually be sacrificed.

Piston Engine Poor

The compound engine, for all its admirable features, is a slow, heavy power plant. While its rate of fuel consumption per ton-mile is the lowest of any aircraft power plant, this rate increases rapidly as the speed of the airplane increases. If an airplane can be useful at 100 mph., then the compound engine can produce a specific fuel consumption of only 0.14 lb. of fuel per hour per lb. of thrust.

But if that airplane is taken up to a cruising speed of 300 mph., this figure increases to that of the reciprocating engine alone. At 500 mph. this consumption is 0.68, which is already within sight of the turbojet engine. For absolute range the compound engine can't be beat but only if that range is flown at less than 200 mph.

Turboprop Problems

The turboprop is in about the same boat as the reciprocating engine because it uses a propeller. It actually suffers in comparison as an altitude engine. Because you cannot "supercharge" a gas turbine engine, the turboprop will always have altitude characteristics markedly inferior to its sea level output. As the turboprop-powered aircraft either increases its speed or its altitude, the engine suffers. Although satisfactory "interim" turboprop engines have been and will continue to be built, most engineers are convinced that this engine will die virtually at birth.

Its high power output (a 10,000 hp. unit has already been developed) entices the airframe designer because it means speed. But after the turboprop engine passes 400 mph., its performance goes haywire and its fuel consumption skyrockets.

Its development problems have proved frustrating. Gearing and control are problems of enormous difficulty. Propeller design for such a huge engine is equally difficult since propellers large enough to absorb these great powers actually weigh as much as the engine itself.

Under 300 mph., the turboprop can exhibit specific fuel consumptions and specific weights lower than the reciprocating engine and provide more than twice as much power while doing so. But 300 mph. is no longer a useful cruising speed for either commercial or military future design.

Turbojet Solution?

The turbojet engines seemingly possesses all the virtues. It can provide enormous power—as much as will ever be required for flight propulsion. This power simply increases the faster the airplane flies; its fuel consumption improves, and the range of a turbojet-powered aircraft can be tripled simply by flying above 40,000 ft. It is light, cheap to build, easy to maintain and virtually fool-proof in operation. It is the ideal power plant for all high-performance aircraft.

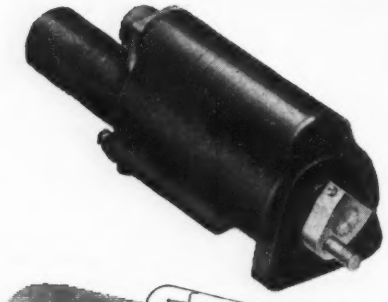
These facts are only now emerging out of the welter of postwar criticism of the turbojet engine. Behind the scenes, enormous progress has been made in the turbojet engine, so much as to warrant the conclusion that Uncle Sam, in company with his friends in England, has put his eggs in this one basket.

But rightly so. The fuel consumption of the turbojet engine already approximates that of the reciprocating engine under some comparable conditions and in its own sphere it is astonishingly less.

What has created this revolution that has rendered economical an engine long condemned as an excessive fuel-user? The National Advisory Committee for Aeronautics, more than any other group, has brought this engine out of its wartime welter of inefficiency and into a practical, down-to-earth economic power plant. This apparent miracle is being brought about by turbine blade cooling.

If the aircraft designer, either commercial or military, can obtain a cruising speed of 550 mph., a cruising altitude above 40,000 ft. and a range of thousands of miles more economically with turbojet engines than with the reciprocating, compound, the turboprop or any other power plant, then assuredly he will share with Claude Ryan the simplicity of design decision that accompanies having only one logical choice of power plant. That situation will exist in the United States before 1950.

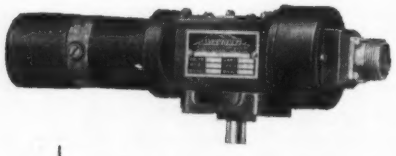
3 ACTUATORS
CONFORMING TO THE LATEST SPECIFICATIONS



Trim Trol

Complete unit for Trim Tab operation with Transmitter.

● Designed for installation in the leading edge of the control surface where it may be employed for mass balance to save weight. Elimination of all backlash from output shaft permits operating tab directly with simple link and allows utilizing varying mechanical advantage increasing with load. Positive overtravel stops prevent damage to structure. Limit switches and position transmitter externally adjustable.



ROTORAC

General purpose right angle Rotary Actuator with Transmitter.

● Right angle type for driving screw jacks or similar mechanisms. Typical rating 15 inch pounds at 60 R.P.M. on 3 minutes out of 15 duty cycle. Higher ratings depending upon application. Wide variety of gear ratios available. Limit switches externally adjustable.

High efficiency Linear Actuator with ball bearing screw.

Lineator

● High efficiency yields operating loads to 1500 pounds with low basic weight. Static capacity over 5000 pounds. Performance characteristics variable to unit application. Limit switches externally adjustable. Presently employed with synchronizing control unit in powered flight control system of an advanced fighter to obtain automatic trim control as a function of speed.

Trim Trol—Rotorac—Lineator conform to the latest specifications and include position transmitters, noise filters and thermal protectors. Synchronizing and positioning controls available.

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AVIATION CALENDAR

Oct. 25-26—Third Annual Indiana Aviation Conference, Purdue University, Lafayette, Ind.

Oct. 27-29—Annual meeting of New York State Aviation Council, Inc., Arlington Hotel, Binghamton, N. Y.

Oct. 28—Society of Automotive Engineers, metropolitan section, transportation and maintenance meeting, Engineering Societies Bldg., New York City.

Nov. 4-5—Society of Automotive Engineers, fuels and lubricants meeting, Mayo Hotel, Tulsa, Okla.

Nov. 7-12—Flight Safety Foundation aircraft accident investigation course, Woods Hole, Mass.

Nov. 10—Aircraft Industries Assn. ETC-PTC committee meeting, New York City.

Nov. 13-16—American Society for Testing Materials, petroleum products and lubricants, Drake Hotel, Chicago.

Nov. 15-17—Aviation Distributors and Manufacturers Assn., sixth annual meeting, Hotel Statler, Cleveland.

Nov. 15-17—National Aviation Trades Assn., annual meeting, Allerton Hotel, Cleveland.

Nov. 16—Aircraft Industries Assn., ATC panel meeting on AN-D-12A, Van Cleve Hotel, Dayton, Ohio.

Nov. 16-17—American Society for Testing Materials, plastics, Atlantic City, N. J.

Nov. 16-18—National Association of Travel Officials, Miami Beach, Fla.

Nov. 17-18—Aircraft Industries Assn., Air Force-Navy-Industry (ATC) meeting on AN-D-12A, Wright-Patterson Air Force Base, Dayton, Ohio.

Nov. 17-19—American Society for Testing Materials, electrical insulating materials, New York City.

Nov. 18-19—American Society for Testing Materials, structural sandwich materials, Philadelphia.

Nov. 23—ICAO southeast Asia regional air-navigation meeting, New Delhi.

Dec. 1-2—Aircraft Industries Assn., Air Force-Navy-Industry (ETC) meeting on accessory oil seals, Washington, D. C.

Dec. 2-5—Annual meeting of the Society for Experimental Stress Analysis, Hotel Commodore, New York City.

Dec. 2-5—Fourth annual international aviation celebration, El Paso.

Dec. 14-15—Aircraft Industries Assn., Air Force-Navy-Industry meeting on accessory drive requirements, Power Plant Lab., Wright-Patterson Air Force Base, Dayton, Ohio.

Dec. 17—Annual Wright Brothers Lecture, Institute of the Aeronautical Sciences, U. S. Chamber of Commerce Bldg., Washington, D. C.

Jan. 5, 1949—Florida Flying Alligator Club, 14th annual reunion, Melbourne, Fla.

Jan. 10-14—Society of Automotive Engineers, Annual Meeting and Engineering Display, Hotel Book-Cadillac, Detroit, Mich.

Jan. 24-27—IAS seventeenth annual meeting, Hotel Astor, New York City.

Jan. 27—Society of Automotive Engineers, metropolitan section, fuels and lubricants meeting, Engineering Societies Bldg., New York City.

Feb. 8—ICAO Operations Division. Place undetermined.

Feb. 22—ICAO Airworthiness Division. Place undetermined.

Mar. 3—Society of Automotive Engineers, metropolitan section, air transport meeting, Engineering Societies Bldg., New York City.

Mar. 24—Society of Automotive Engineers, metropolitan section, areonautics meeting, Engineering Societies Bldg., New York City.

Apr. 11-13—Society of Automotive Engineers, National Aeronautic and Air Transport Meeting, Hotel New Yorker, New York.

PICTURE CREDITS:
Wide World, 15.

From High-Speed Bombers to High-Speed Transports

MARTIN LEADS THE WAY INTO THE FUTURE!

YESTERDAY: The famous Martin B-10 bomber, faster by 100 m.p.h. than any other bomber of its day and speedier than most pursuit ships, made obsolete nearly all the world's military aircraft; won the 1932 Collier Trophy for Glenn L. Martin.

TODAY: The Martin 2-0-2 as a military transport can carry 61 military personnel or more than 15,000 pounds of military cargo—over twice the capacity of twin-engine equipment used in World War II and still in service. And the 2-0-2 cruises at speeds 100 m.p.h. faster than the World War II planes it replaces . . . yet operates from the same short runways, small airports.

Tomorrow

Martin engineers are constantly at work harnessing higher and higher speeds to the transport and combat needs of our Military Services. In the days to come, look to Martin for rotary wing aircraft and other swiftly developing fields.

The Glenn L. Martin Co., Baltimore 3, Md.

Martin
AIRCRAFT

Builders of Dependable Aircraft Since 1909

"FLAK BAIT," Devon Francis' new book, is the thrilling story of the heroic men who flew and serviced Martin B-26 Marauders in bomber strikes from the Southwest Pacific to the gates of Berlin. We are proud to be mentioned with these gallant men.

Watch the
New Wings over the Navy
NAVY DAY, OCT. 27

READY TO MEASURE AIR IN SLOW MOTION

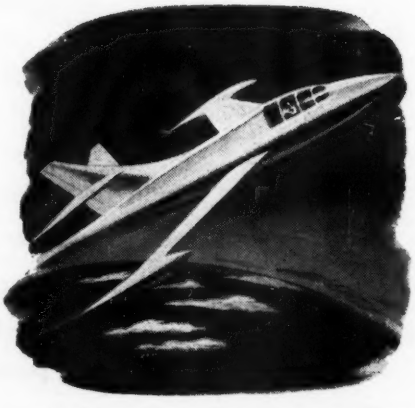
▶ In about the time it takes you to read this advertisement, a one-ton mass of high velocity air can roar into this 20-foot "plenum" chamber and be suddenly flagged down to slow, pulseless motion so that engineers can measure it accurately.

▶ The chamber is one of the many devices used in the Wright Aeronautical research laboratories to study and evaluate the performance of compressors for jet propulsion type engines.

▶ Because air leaving a powerful compressor travels at very high velocities, it is difficult to determine the exact amount of pressure built up by it. By the use of this huge plenum chamber, the high velocity or difficult-to-measure pressures are converted to static or easy-to-measure pressures.

▶ The accuracy of the data obtained by testing various compressor designs in this unit is very important to Wright engineers... because a small improvement in compressor efficiency results in a considerable increase in the overall efficiency and power output of new engines... and better efficiencies and higher powers are their constant goals.

▶ Another example of the painstaking research behind the development of Wright aircraft engines.



POWER FOR AIR PROGRESS

WRIGHT Aeronautical Corporation • Wood-Ridge, New Jersey

A DIVISION OF CURTISS WRIGHT FIRST IN FLIGHT

NEWS DIGEST

DOMESTIC

For the first time in the history of the Personal Aircraft Council an engine manufacturer was named to head the AIA organization when C. J. Reese, president of Continental Motors, Muskegon, Mich., was named chairman at a meeting in Detroit last week.

U. S. Air Force issued call for 10,000 former airmen to return to active duty for immediate assignment to units in England and Western Europe. Applications will be received at any U. S. Army recruiting station.

Edward F. Wilbur, Jr., design engineer of the radio division of Bendix Aviation Corp., has been appointed chairman of the Radio Technical Commission for Aeronautics special committee SC-46, which will investigate and make recommendations for standard airborne control panels.

Three flights of Five Boeing B-50s will be sent to Alaska for winterization training between Nov. 1 and Mar. 15. They are part of the 43d Bomb Wing, Strategic Air Command and will be based at Fairbanks.

Lockheed Aircraft Corp. is putting a Constellation through CAA tests for a certificated gross weight of 105,000 lb., a 3000-lb. increase.

FINANCIAL

Douglas Aircraft Co. declared dividend of $5 a share on 600,000 shares of outstanding common stock, payable Nov. 24 to holders as of Nov. 3.

Northrop Aircraft, Inc., paid dividend of 25 cents a share Oct. 13 to holders of record Oct. 6.

Menasco Manufacturing Co. has called stockholders' meeting for Nov. 10 in company's offices at Burbank, Calif. Company recently reported profit of $14,515 for fiscal year ended June 30 on sales of $8,349,449.

FOREIGN

British Ministry of Supply has ordered 20 Airspeed Ambassador, twin-engine, 40-passenger transports for British European Airways.

Royal Dutch Airline (KLM) has started a new service direct from Montevideo, Uruguay, to Geneva.

International airline traffic transactions at the IATA clearing house in London reached a new high of $12,317,000 in August. January-August clearing house transactions totaled $68 million, compared to $25 million in the similar 1947 period.

Russian airlines serving Moscow have begun home-delivery of tickets ordered by telephone.

INDUSTRY OBSERVER

► **Northrop is negotiating with the Air Force for the conversion of the remaining YB-35 reciprocating engine bombers to the YB-49 type jet Flying Wing. The jet-wing version has exhibited performance far in excess of its original guarantees, and Northrop sees no reason for completing the remaining Flying Wings in a configuration of lesser performance.**

► Continuing the theopathic series of names for McDonnell aircraft, the McDonnell XF-85 has been named the Goblin and the XF-88 has been named the Voodoo.

► **Northrop Turbodyne is slated for type testing by the Air Force, and eventual sizable production contracts are expected. The turboprop engine has already delivered 10,000 hp. (greatest power ever produced in a single aircraft engine of any type) in one version and more than three different versions have been developed.**

► Multi-engine test-bed for the Napier Naiad turboprop installation for the new Vickers-Armstrong Viscount 36-seat transport will be the obsolescent Vickers Windsor Mark I, a geodetic-construction four-motor bomber. First prototype Viscount has four Rolls-Royce Dart turboprops delivering a total of 4000 hp. plus 1300 lb. static thrust as against the Naiad's greater power of 6000 hp. plus 960 lb. S.T.

► **Chase Aircraft Co. is completing its C-122 twin-engine assault transport with a target flight date early in November. Meanwhile, Air Force has completed static tests on the CG-18, the C-122s glider counterpart, with all requirements exceeded, and three CG-18As have been delivered.**

► Consolidated Vultee is still seeking funds to set up its airplane leasing corporation (AVIATION WEEK, Oct. 4), but eventual fate of the plan may depend more upon other manufacturers' reaction than upon ability to raise capital. Transport plane manufacturers in general reportedly are cool to the idea. They fear the leasing corporation would become so large it could dictate plane types and designs. It is problematical whether Floyd B. Odlum, Convair chairman, will press the leasing plan for Convair planes alone unless he has some assurance that eventually the corporation could handle planes of other manufacturers as well.

► **U. S. observers returning from the various aviation conferences held recently in Europe feel that the Russian satellite nations are just about ready to close their borders to the carriers of western nations. Opening gun of the campaign may be a Czechoslovakian move to stop British European Airways service in Prague.**

► New jet fighter will be developed for the Royal Australian Air Force by the Commonwealth Aircraft Corp. CAC is now tooling up to produce the Rolls Royce Nene jet for installation in the de Havilland Vampire, but the RAAF has been so impressed with performance of the Grumman Panther, powered with the same turbojet, that it wants a similar model designed and built in Australia. Meanwhile, assembly of the obsolescent Mustang fighter is continuing at the CAC plants. The Mustang program may even be extended for another year until jet-powered types go into production.

► **British helicopter mail experiments, flown over 230 route miles in East Anglia, are stimulating extensive interest in that, to date, 96 percent of schedules have been completed in all-weather and night flying operations. The report comes from C. Colin Cooper, publications director of the Helicopter Assn. of Great Britain, now in the United States studying this nation's helicopters and gathering a library of U. S. helicopter development information.**

► British have been having trouble with the efficiency of their new night fighter radar, the A.I.MK.9 "lock-follow" system. Feature of this new radar device is to project graticule, airspeed, horizon and target on the windshield so that the pilot need not remove his eyes from the night sky. When first contact is made, "lock-follow" A.I.MK.9 connects search radar to auto-pilot and theoretically the search fighter and intruder bomber are never parted until the fighter pilot disconnects the auto-pilot.

Vol. 49, No. 17

AVIATION WEEK

Oct. 25, 1948

Navy Air Arm Debate Flares at Clinic

Charge that Navy tries to usurp AF job gets sharp official retort from admiral.

By Alexander McSurely

DETROIT—Heavy verbal bombardments traded by Air Force and Navy adherents at the sixth National Aviation Clinic roused delegates in a spirited climax to otherwise lethargic early sessions.

Rear Adm. E. A. Cruise, chief of the air warfare division, office of chief of naval operations, touched it off in a bristling talk which he said had been approved in Washington. He lambasted "publicity campaigns touting weapons which convince the man in the street, and too often also those citizens who have the power of decision, that the complete solution to our nation's security is just around the corner in some magic device or, worse still, by accepting capabilities for our existing weapons which are figments of the imagination."

▶ **World War II Results**—Citing detailed statistics of naval carrier operations in World War II as disproving criticisms that aircraft carriers are highly vulnerable and at the mercy of land-based aircraft, he pointed out that five large fast carriers and six small escort carriers were lost, an attrition of only 10 percent out of a total of 33 fast carriers and 77 escort carriers.

Three of the large carriers were lost to Japanese carrier planes and two to Japanese submarines; two of the escorts were lost to submarines, one to naval surface gunfire and three to suicide kamikaze planes, he said. In the war against Japan, carrier task forces destroyed over 12,000 enemy aircraft, Cruise reported.

Citing the Jap Pearl Harbor attack as an example of a carrier strike, Admiral Cruise said that the Japs sent in 360 carrier planes against 385 U. S. shorebased planes, yet not a single Jap plane was shot down by U. S. aircraft and not a single bomb was dropped on Jap ships.

▶ **Navy Campaign**—The Cruise blast, which bore all the earmarks of high Navy strategy in the continuing campaign to establish naval air power on a firmer footing in the National Defense Establishment, was a stormy reply to earlier remarks of Kern Dodge, Philadelphia engineer and president of the Air Defense League.

Said Dodge: "Not only is the Navy trying to usurp the long-range striking prerogative which is essentially the job of the Air Force arm of our defense, but now they propose to unload on the public a duplicate air force and then wish to expand the Navy to match their air force.

"The carrier is nothing in the world but an implement to aid the Air Force to do its work more efficiently. Navy men have been trained to think only in terms of their sacred unit, the battleship. If given the aviation they seek, they will use that aviation more as a protection of their floating ships than in terms of long range striking forces.

"May I remind you that the 'Jimmy Doolittle' force was Army flyers, and a carrier (USS Hornet) was used merely as a transporting medium to get the Army flyers within striking distance of Tokyo. The Navy in this instance did not run their carrier near enough and when they saw a few Japanese fishing boats, turned back, so I have heard, in order to protect their carrier, resulting in the loss of all the airplanes and many of the flyers."

▶ **Stratemeyer Listens**—Dodge spoke in opposition to a proposed bill of policy which sought to put the Clinic delegates on record as urging Congress "to provide for procurement of aircraft and equipment necessary to build Naval Aviation up to the strength already authorized by law. (12,500 planes.) Dodge declared the proposal was diametrically opposite to the actions taken at earlier Clinics.

Midway between Dodge, who spoke from a floor microphone, and Admiral Cruise, who took the speakers' rostrum for his longer remarks, sat Bulky, red-faced Lt. Gen. George E. Stratemeyer, commanding general, Air Defense Command, and ranking Air Force officer present. He had just finished reading a thoroughly uncontroversial talk, and did not choose to take up the verbal cudgels for his service arm.

At AVIATION WEEK deadline, the controversy was ready to come up for further airing next day with red-haired Jackie Cochran, woman speed flyer and former national WASP commander, warming up a rebuttal to the Navy. Miss Cochran, as a member of the rules committee of the Clinic, had vigorously opposed a committee proposal urged by Melvin Maas, former Marine flyer and ex-Congressman, that the Naval Aviation bill of policy be merged with another bill titled: "To secure legal authorization for an Air Force of the size and composition necessary for the air security of the United States."

▶ **Private Flying**—Efforts to urge personal aircraft manufacturers to build their airplanes to meet the dimensions of the human body, proposed in a bill of policy by private flying interests, went down to defeat on the Clinic floor.

CAA Administrator Delos Rentzel, however, announced that CAA was doing a research program on this subject and invited manufacturers to use CAA findings. Dwane Wallace, Cessna president, and Personal Aircraft Council chairman, pointed out that most present day personal aircraft manufacturers already were familiar with the Army-Navy handbook pilot dimensions. But he did not indicate that any present-day planes are being built with those specifications in mind.

Joseph T. Geuting, Jr., manager of the Personal Aircraft Council, and Clinic clerk, poked fun at the bill when he introduced it with the remark that the bill had been nicknamed the "posterior parameter" bill in the rules committee.

▶ **Prototype Bill**—Despite some industry feeling previously expressed that transport prototype subsidization through Congressional appropriation is not desirable, a bill of policy urging Congress to enact such subsidization at the next session was passed by the Clinic without dissenting vote.

It asked for development of multi-engine cargo planes, multi-engine trunkline passenger and cargo transports, multi-engine feeder transports, and multi-engine jet powered transports.

▶ **Reserve Merger**—A bill urging the merger of the Air Force Reserve and the Air National Guard brought a faint voice of dissent from some of the state government representatives, but was passed by a strong majority.

In discussions off the floor, some state spokesmen pointed out that the biggest obstacle to any such merger is the fact that states have built and own many of the Air National Guard hangars, and that transfer of this property might be a serious obstacle in the marriage of the two reserve groups.

▶ **Work Done**—Early Clinic sessions droned on with surprising unanimity for any aviation gathering. Bill after bill was approved with only minor changes at most, and with only perfunctory discussions.

Among bills of policy approved by the Clinic delegates at early sessions:

- Congress was urged to create and maintain a permanent air policy board.
- Congress and Veterans Administration were urged to revise GI flight training requirements so that justification for the course would be established by a simple affidavit of the veteran that he expected to use the course in his business or vocation.
- Exemption of operators of aircraft from payments for immigration and customs inspection services was also asked at the session.

Excessive Fire Losses Blamed on Management

The aviation industry has "woefully inadequate fire protection, compared to the average industry in the United States," according to William H. Rodda, secretary of the Transportation Insurance Rating Bureau.

"Flying business in the U. S. lost by fire last year something over $9,000,000 worth of airplanes and hangars, and this figure does not include the additional millions lost because of interruption of business following fires," he declared in a speech prepared for delivery last week before the 36th National Safety Congress and Exposition in Chicago.

▶ **Shortcoming**—Rodda called the inadequate airport fire protection "a management shortcoming," pointing out that efficient organization of existing employes is the need, rather than expending huge sums for fire fighting equipment.

His recommendation: a trained group of men in each department "whose duty is to see that fires are controlled in early stages and to see that the municipal fire department is called immediately when a fire breaks out."

▶ **Immediate Action**—Rodda emphasized that the volunteer units are not intended to substitute for professional units, but cited several instances of more rapid fire control when immediate and efficient action by airport employes was available.

He recalled a fire at Washington National Airport (in February) when a fireman was able to reach the controls of the plane through a cockpit window and shut off the engines. Gasoline was being sprayed through a broken fuel line, and the fireman's knowledge of the aircraft was a "material help in controlling the fire."

▶ **Supplemental**—"It is unfortunate," Rodda said, "that professional-type fully manned fire departments are not available and apparently will not be available at many airports for some time to come." He called his recommendations "supplemental" to regular fire departments where they are available.

His conclusion: "Most airport fires start small and can be controlled in their incipient stages, provided there is someone present who is trained to attack them instantly and intelligently."

Air Force Cancels F-87 Contract

First change comes in 1949 USAF allocation schedule: other revisions expected in procurement program.

First revision of the U. S. Air Force fiscal 1949 aircraft procurement program came last week with cancellation of a letter of intent to the Curtiss-Wright Corp. for production of 88 F-87 twin-jet night fighter and photo-reconaissance planes.

Cancellation of the F-87 contract was the first concrete result of rumblings that have been emanating from the Pentagon for some time regarding a re-evaluation of the current aircraft procurement program. Additional changes in the fiscal 1949 program are expected but most changes will be in the fiscal 1950 budget now being submitted to the National Defense Establishment and the Budget Bureau.

▶ **$80,000,000 Contract**—The F-87 was to have been built at the Columbus plant of Curtiss's Airplane division. USAF letter of intent specified 58 F-87 night fighters and 30 F-87A photo reconaissance versions. Production contract would have been for about $80,000,000.

Curtis already had a $1,500,000 allocation from USAF for preliminary tooling and production engineering on the F-87. That fund is already in process of renegotiation. The XF-87 recently completed its USAF flight tests at Muroc and flew back to the Columbus plant on its first extensive cross-country flight. The XF-87 is powered by four Westinghouse 24C jet engines. Second prototype now under construction at Columbus was redesigned to carry two General Electric J-47 jet engines. USAF will have Curtiss complete the second XF-87 and put it through the regular experimental flight test program.

▶ **Flight Tests**—Cancellation of the F-87 contract came shortly after the USAF sent the XF-87 aloft at Muroc with the Northrop F-89 and Douglas F3D, both twin-jet night fighters in competition with the F-87. USAF pilots flew all three night fighters in comparative tests. Although there were some rumors from the Pentagon that the F-87 money would be diverted to transports, they were not generally credited by industry observers.

More likely disposition of the funds will be for either the Northrop F-89 or the Douglas F3D, now being built as a carrier based night fighter for the Navy. The USAF 70-Group program calls for three groups of all-weather (night) fighters. At present the USAF has only non-jet aircraft available for all-weather work.

In any case it will be some time before the F-87 funds are finally allocated. Whatever decision USAF makes on these funds will have to be resubmitted to the Secretary of National Defense and the President for approval and certification. USAF officials made it quite clear that all new aircraft procurement whether it involves new funds or redistribution of funds approved earlier must clear through these channels.

Successful Flight by XF-85

McDonnell XF-85 parasite fighter successfully completed a launching and retrieving operation aboard its Boeing B-29 "mother" plane. The successful flight by company test pilot Ed Schoch followed by nearly two months the original attempt which ended in failure (AVIATION WEEK, Sept. 20).

The successful retrieving operation came at the end of a 20-minute test flight during which the stability and control of the 21-ft. swept-wing fighter were tested. The plane had only recently been repaired following the damage caused by an emergency landing.

CAA and Pilots Split on Lighting

Argument over approach aids, once thought settled, flares again as federal agency promotes own system.

By Robert Hotz

Sharp conflict between the Civil Aeronautics Administration and the airline pilots is developing over a proposed revision of high intensity approach lighting standards set last year.

These standards were approved by the Air Force-Navy-Civil committee of the Aeronautical Board on aviation ground and seadrome visual aids and equipment and installations. They called for a double row of parallel lights extending 3000 ft. from both sides of the runway.

► **Red and Yellow**—Lights in the left hand row were to be red with those on the right to be yellow. Only the left row was to be installed at civil airdromes, due principally to the strong minority report filed by the Air Lines Pilots Association and backed by Air Transport Association and Civil Aeronautics Board representatives on the airport lighting committee.

These standards were admittedly an interim proposal until an exhaustive flight test program could be conducted on equipment then available and new types of approach lighting still in the development stage. This flight test program has been concentrated at the Landing Aids Experimental Station, Arcata, Calif., under administrative supervision of CAA.

(For detailed descriptions of the various high intensity approach lighting systems being tested at Arcata see AVIATION WEEK, May 31).

► **Summary Report**—LAES recently submitted a summary report on the first three months of 1948 fog season tests consisting of some 300 bad-weather approaches using six systems of high intensity approach lighting. This report recommends that the remainder of the fog season be devoted to testing only three types of systems with top priority being given to the CAA-sponsored slope line system developed by H. J. Cory Pearson. Pearson is chief of the lighting section of the airport development division of CAA's technical development office. He is also chairman of the Arcata administrative panel, which directs the LAES program and a member of the ANC lighting subcommittee. CAA took over active direction of Arcata last March.

Second priority is recommended for further tests on the parallel row systems, using both Bartow (Line Material Co.) and American Gas Accumulator Co. (AGA) lights. Third priority is urged for single row flashing light systems with Sylvania and Westinghouse equipment. The Sylvania system has been transferred to Arcata from Newark where airline pilots used it experimentally. A Westinghouse system, similar to the one now installed at New York's Idlewild, is under construction at Arcata and was expected to be ready for test work early in November.

► **Slope-Line Praised**—The LAES summary report's high praise for the CAA-Pearson slope line system stirred a sharp reaction from airline pilots represented by both the Air Line Pilots Association and the Air Transport Association. Both these groups favored the single row red left-hand installation as an interim system and leaned toward the single-row flasher type for a final system. Their attitude was based primarily on experimental use of the Sylvania flashing lights with neon bars at Newark Airport.

A delegation of airline chief pilots headed by John Gill, chief pilot of Eastern Air Lines and ATA representative on the lighting evaluation committee, went to Arcata after submission of the LAES summary report to fly the slope line system. Their comment on the system differed considerably from the LAES report. Airline pilots said that while the slope line system worked well in clear weather when the entire line of lights was visible, in bad weather only two or three sets of lights could be seen, and they were not sufficient to orient a pilot with the runway. They also noted difficulty in identifying the right and left hand rows of the slope line lights. They also questioned the practical installation of the slope line at many major airports due to terrain difficulties. Ernest Cuttrell, of American Airlines, and ALPA member of the airport lighting evaluation committee, supported these criticisms of the slope line system.

► **Report Quoted**—The LAES report had the following comments on the slope line system:

"With the C-47 and equivalent aircraft the limit of predominant success (80 percent or better) has not yet been reached with ceilings as low as 50 ft. and visibilities as low as ⅛ mile. With single engine aircraft, failures occur only in well-defined conditions of extremely restricted ceiling and visibility apparently because the lack in forward visibility is made up by good maneuverability that enables the pilot to cast glimpses right and left while 'fish-tailing'."

The LAES report blamed lack of success for the slope line system in tests using a B-17 on the poor visibility offered a pilot downward and to the right in that type of plane. LAES reported the slope line system had good identification characteristics; fair to unsatisfactory distance indication from the end of the runway; good right or left deviation indications for the C-47 and fair to unsatisfactory for the B-17; good altitude indication for the C-47 and fair for the B-17; good directional guidance and fair roll guidance.

FIRST DOUGLAS FIGHTER

Short Navy memory credited XF3D-1 as "first Douglas Navy fighter," but this photo shows Douglas XFD-1 of 1933 which was also a two-seat fighter, one of four competing designs of the period. Powered by Pratt & Whitney R-1535-64 Twin Wasp Junior engine of 700 hp., the XFD-1 did 204 mph. at 8900 ft. It weighed only 4750 lb. but carried one .30 and one .50 cal. machine gun in nose and a flexible .30 in rear cockpit. Plane continued flying until 1939, when it was scrapped. Navy decided that neither Douglas XFD-1, Berliner-Joyce XF2J-1, Vought XF3U-1 nor Curtiss XF12C-1 was good enough to warrant keeping and abandoned two-seat fighter idea.

► **Controversial Points**—One of the strongest points of contention between the airline pilots who, by CAA calculations, do 75 percent of the instrument weather flying in the United States, and the lighting engineers who have a strong voice in the Arcata project, is whether altitude, distance and roll guidance are necessary in an approach lighting system. The pilots contend the primary job of approach lights is to provide them with positive identification of the approach lane and to line them up with the runway before they reach it. They prefer to rely on their cockpit instruments for altitude, distance from the runway and roll guidance. The lighting engineers, on the other hand, are striving to put all of these aids into an approach lighting system.

Airline pilots who recently flew at Arcata also criticized the Sylvania installation there. They pointed out that at Newark the 2800 ft. Sylvania system had 48 light units and that pilots recommended this installation be strengthened by the use of additional units. They contend that the Sylvania installation at Arcata uses only 30 units in a 3000 ft. installation. According to their recommendations the Arcata installation should have 58 units to provide the required intensity. They were also critical of the LAES single-row center line installation in which ordinary beacon course lights with red filters were used instead of a high intensity approach light.

► **Seek New Agreement**—Main objective of the Arcata high intensity approach light tests is to produce data that can be used in the December meeting of the Air-Force-Navy-Civil lighting committee to determine a final standard for approach lights. CAA has spent $200,000 for two sets of AGA red high intensity approach lights for installation at Washington National and Los Angeles Municipal airports in accordance with the ANC interim standard. CAA spokesmen indicated that they would delay letting contracts for an additional 10 approach light sets (authorized in the fiscal 1949 budget) until a new ANC standard was set.

They also indicated they were hopeful of getting ANC agreement on the CAA-Pearson slope line system as the standard approach lighting system. An International Civil Aviation Organization group will meet in 1949 to determine international approach light standards. CAA hopes to have a firm U. S. stand to carry into that meeting where stiff competition is expected from the British Calvert-designed system.

► **System Comment**—Following are LAES summary report comments on the other systems tested at Arcata:

• **Single-row**—At the visibility limits specified by the airport lighting evaluation committee, no appreciable difference can be detected in the respective performance of the Bartow pattern and the center-line (red-filtered course lights) configuration. Random failures were encountered under all test conditions unless a definite natural ground plane is visible to the pilot in both day and night operations. Pilots comments on all phases of these systems were: unsatisfactory except for directional guidance which was fair. Operational limits were recommended at 200 ft. ceiling and half-mile visibility.

• **Two parallel row**—No appreciable difference can be detected in the respective performance of Bartow and AGA systems. Pilots' comments indicated unsatisfactory altitude in formation; good directional guidance; fair roll guidance and fair to unsatisfactory lateral deviation indication and distance measurement. Operational minima for C-47s and single-engine aircraft were ⅞ mile visibility with zero ceiling and ½ mile visibility with 100 ft. ceiling; for B-17: ¼ mile visibility with zero ceiling and ⅞ mile visibility with 100 ft. ceiling. For night operations 100 percent increases in minimums are indicated.

• **Sylvania flashing lights with neon bars**—Predominant random failures in all test conditions unless natural ground plane visible at the middle ILS marker. Pilots' comment indicated: excellent identification; fair to unsatisfactory distance measurement; dangerously unsatisfactory left and right guidance; unsatisfactory altitude indication; fair directional guidance and unsatisfactory roll guidance. Operational minima suggested for all type planes used at Arcata were 200 ft. ceiling and ½ mile visibility for both day and night.

The report also noted "confusing stroboscope effects on propellers" that leads some pilots to think their propellers are feathered. When the flasher is used superimposed on the left hand row of two parallel row systems flashing light causes an illusion of rotation due to the forward travel of the flashers to the left of the pilot and the rearward trailing of the lights in the right row.

Hiller Helicopter Gets Certificate

Fourth approved type certificate ever awarded a commercial helicopter has been granted by the Civil Aeronautics Administration to 23-year-old Stanley Hiller's United Helicopters, Inc., for its Hiller 360 utility rotocraft.

United is the first company in the west and the third in the nation to get a helicopter ATC. Others are Bell Aircraft (the first) and Sikorsky, which has two models certificated.

With the proceeds of a new $1.5 million common stock issue, Hiller's company plans to go into immediate production of the three-place 360. The goal is optimistic: a selling price of slightly less than $20,000. Hiller thinks he can do it because of production simplification and the fact that the usually complex rotor system is reduced to seven components that can be cast rather than forged.

United Helicopter's certificate is for the open cockpit model shown hovering over the Golden Gate Bridge at San Francisco, near company's plant at Palo Alto. For the time being, that's what the production model will look like. If future demand justifies an enclosed cabin, Hiller's firm will produce it, but the craft, of necessity, would have to be re-certificated.

2-0-2 Report

CAB experts blame Winona crash on structural failure of left wing.

Technical witnesses appearing at one of the most exhaustive accident investigation hearings ever held before a Civil Aeronautics Board safety panel have testified that structural failure in the left wing probably caused the crash of the Northwest Airlines Martin 2-0-2 near Winona, Minn., last Aug. 29.

Sydney D. Berman, chief of the technical section of CAB's Bureau of Safety Investigation, said that "contact apparently was made in the air between the left wing and the fuselage." The wing evidently came off while the 2-0-2 was flying through a severe thunderstorm. Thirty-seven persons—all aboard the NWA plane—were killed when the ship crashed into a Mississippi River bluff.

▶ **Tail Severed**—Berman's conclusions that the wing was torn off were based on scratches and dents in the fuselage and on findings that the plane's tail had been severed, presumably by the wing. He said there was no indication that lightning had struck the plane. Other technical experts at the two-day hearing in Winona reported no evidence of power plant failure prior to the crash.

Microscopic examination of the failed fitting on the left wing front spar showed a number of "fatigue fractures" which developed over a considerable period of time and a final break caused by heavy stress, Berman disclosed. The break was at the joint between the inner and outer wing spars. Similar fatigue cracks were found in the wing of another 2-0-2 flown through the same turbulence but landed safely. Examination disclosed that the right front spar cap had broken "clear through."

▶ **Planes Grounded**—Discovery of damage to the second Martin aircraft was followed by NWA's voluntary grounding of its remaining 24 2-0-2s (AVIATION WEEK, Sept. 13). Subsequently, fatigue areas and cracks were discovered in the spars of three other planes. Berman noted that results of metallurgical tests showed that the chemical composition and strength properties of materials obtained from specimens cut adjacent to the failed parts complied in all respects with specifications for this type of aluminum alloy material.

Modifications suggested by Martin engineers have now been completed on a number of 2-0-2s (AVIATION WEEK, Oct. 11), and two of NWA's grounded planes were back in service by the middle of this month with CAA approval. Martin officials testified that every fault in the area of the suspected wing fittings had been corrected by the modifications.

▶ **Door Trouble**—Earlier, pilot "squawk sheets" involving individual 2-0-2s were placed in evidence by CAB Safety Investigator John Runger. Among recurrent difficulties was failure of the landing gear to retract properly. Nose gear doors and baggage doors sometimes were hard to operate, and on several occasions front cargo doors blew open and were torn off in flight. This condition is being remedied by different hinging and latching mechanisms.

Carl C. Magnuson, NWA's superintendent of line service and maintenance, said the carrier had not been negligent in correcting mechanical defects about which the pilots had complained.

Martin officials emphasized that before the 2-0-2s were delivered to airline customers the structure was subjected to more severe fatigue tests than required by CAA. They said no concern was felt for the wing fittings.

▶ **ALPA Statement**—At the hearing's close, the Air Line Pilots Association introduced a statement contending that present Civil Air Regulations dealing with structural requirements are inadequate to insure structural soundness for the life expectancy of commercial transports. The union said the federal government, possibly through the Air Force, should establish a testing service for new transports.

"We recommend more widespread installation of VG and altitude recording devices by the airlines," ALPA declared. "Data from these installations should be processed by a responsible agency for the specific purpose of establishing fatigue and strength specifications in transport category aircraft design and inspection requirements."

Maj. Gen. Tunner (See Berlin Speedup)

Berlin Speedup

U. S., U. K. lifts are merged; traffic pattern changes now in effect.

The Berlin airlift is buckling down for the tight winter months. U. S. and British efforts to supply the blockaded German capital have been consolidated under one operational command, and new traffic patterns have been worked out to increase the number of trip frequencies.

Maj. Gen. William H. Tunner commands the unified "Combined Air Lift Task Force." His deputy is Air Commodore W. F. Merer. Tunner's headquarters will be in Wiesbaden, Germany. The agreement to coordinate the American and British lifts was signed at Wiesbaden by Lt. Gen. Curtis E. LeMay, in one of his last official acts as USAF commander in Europe, and Air Marshal Sir Arthur P. Saunders, chief of British Air Forces in Germany.

LeMay left soon after to take his new post as chief of the U. S. Strategic Air Command with headquarters at Andrews Air Base, Washington. He is succeeded in the position by Lt. Gen. John K. Cannon.

▶ **Belt Operation**—When these changes occurred, the airlift had developed into a continuous belt operation. Block flying has been abandoned, now that the C-47 workhorse has been retired from the blockade run in favor of an all-C-54 operation.

McGraw-Hill World News reports from Berlin that the "belt" system has three advantages: a single plane can now make six trips daily instead of a maximum of four, the increase in the number of trips per plane allows more maintenance time, and parking of aircraft has been made easier.

Traffic control has been simplified to the nth degree. GCA is in a new commanding role. Planes now turn off the Tempelhof range into a rectangular GCA approach pattern, which enables three and sometimes four planes to be under GCA control at one time.

If a pilot misses his approach, he is not permitted to reenter the pattern but must return with his load. Sacrifice of an occasional cargo of coal or flour is considered better than risking interference with the new routine. Since the beginning of the airlift, every effort has been made to avoid stacking and holding patterns at Tempelhof.

One outstanding feature of the lift has been the movement of heavy engineering equipment for construction of additional runways at Tempelhof and the new Tegel airfield.

Profits Ahead?

With six months' sales running better than last year, outlook is bright.

With the aircraft manufacturing industry undergoing its greatest peacetime expansion, available figures have fallen so far behind they no longer mirror its actual status. But those on hand covering part of the year point a strong possibility: highest peacetime sales in history and overall profits for the first time since 1945.

Reports to the Securities & Exchange Commission of sales by major manufacturers in the first six months of the year furnish one indication of an upswing in industry fortunes. Sales for that period by 19 manufacturers (including all the big ones) total $487,543,000. This is more than $40 million greater than the results in the like period of 1947.

▶ **Second-Half Pickup**—The SEC figures are a guide to the full year's results, but only a rough one. They include some, but not all, revenue received by engine manufacturers. And they may be far off for manufacturers who during the first half already were working on large military contracts.

Much of the new procurement money will not show up on company reports until next year. But enough should figure in this year's results to push second-half sales above the first six months' total. In the end, 1947 revenue may reach $1.5 billion. Sales figures are a tricky realm in which to try to estimate aircraft industry profits due to varied company handling of progress payments, payments on development and cost-plus-a-fixed-fee contracts, and confusion over what is meant on reporting forms by the very word "sales."

Most manufacturers, however, have used up their loss carryback entitlement. So even if revenue fell considerably below the $1.5 billion estimate, there still should be room for profits.

▶ **Northrop Up**—Report for the year ending July 31, 1948, of Northrop Aircraft, Inc., shows what should be a common result in the next few months: net profits far above those of the preceding year. After federal income taxes, Northrop netted $520,146, more than double the recorded previous year's earnings.

The company's earnings for fiscal 1948 were reduced by $369,000, amount of the loss on Salisbury Motors, the non-aviation subsidiary which went into receivership.

Northrop reports a backlog of $96 million as of July 31, but it probably is much higher by now. While in almost every respect one of the smallest of the major companies, the Hawthorne, Calif., firm has one of the longest lists of military projects: B-35, B-49, C-125, F-98 and X-4. The company's annual report discloses that a "satisfactory fee" is being received for awarding a subcontract to Consolidated Vultee Aircraft Corp. for the manufacture of the B-49 bomber.

▶ **Convair Gaining** — Almost alone among the major manufacturers to report for a part of 1948, Convair shows a loss, and the prospect of completing the year in the red.

For the six months ending May 31, 1948, Convair reports a net loss of $7,534,419. Floyd B. Odlum, board chairman, attributes this to development of the Convair-Liner. For the year that ends Nov. 30, loss is expected to run between $9 million and $9.5 million. But the company hopes that will be all, as it expects this year to finish charging off the loss on the Convair-Liner.

While Convair hopes that the eventual answer to getting out of the Liner project with a profit will be the equipment leasing corporation it has proposed (AVIATION WEEK, Oct. 4), it already is gaining ground, company-wide, on military business.

On May 31, backlog amounted to $168 million, with military orders accounting for $134 million. Since then have come the $5 million subcontract from Boeing for B-50 parts, the $30 million T-29 (military liner) and the B-49 subcontract, amount of which has not been disclosed. In the six-months' report Odlum states that the Air Force has assured the company that there is no intention of canceling or cutting back the B-36 order.

Flader Turbine Engines To be Sold by Clark

A long-term, joint arrangement under which Clark Bros. Co. of Olean, N. Y., will manufacture and distribute for general industrial use gas turbines and axial compressors designed by Fredric Flader Inc., Buffalo engineering and research concern, has been announced by the two companies.

Flader will be responsible for research, engineering and design, and Clark Bros. will manufacture and distribute the products.

Clark Bros. claims to be the country's largest manufacturer of gas-engine-driven compression equipment. It is a wholly owned subsidiary of the $50,000,000 Dresser Industries, Inc. of Cleveland.

Although Dresser has acquired a financial interest in Fredric Flader, Inc., the Buffalo concern emphasized that it continues to be locally owned and locally managed. More than half the stock is held by company personnel. The Niagara Share Corp. of Buffalo also continues to hold a substantial stock interest.

BRIEFING PRODUCTION

Curtiss-Wright Corp.'s Columbus Airplane division has received a Navy contract for overhaul of 49 Douglas R4D transports at a cost of approximately $2 million. Estimated completion date: July 1, 1949.

Texas Engineering & Mfg Co. Dallas, has stepped up from 15 to 25 planes a month its C-54 modification work for the Air Force.

AiResearch Mfg. Co., Los Angeles, reports order totaling more than $2 million for refrigeration units, cabin pressure controls and other special equipment designed especially for military planes.

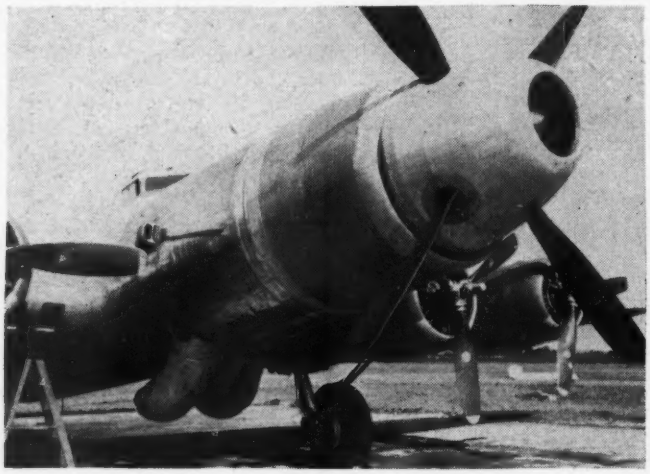
Grumman Aircraft Engineering Corp. is moving its aluminum truck body production from the Bethpage, L. I., plant to a recently purchased factory at Athens, N. Y. Purpose is to make more room for plane production at the Bethpage plant.

Goodyear Aircraft Corp., Akron, Ohio, once again is producing military goods, after being in the civilian field since the end of the war turning out frozen food cabinets, juke boxes, metal caskets and other products. Current contracts include radar equipment, airplane parts and fuel tanks.

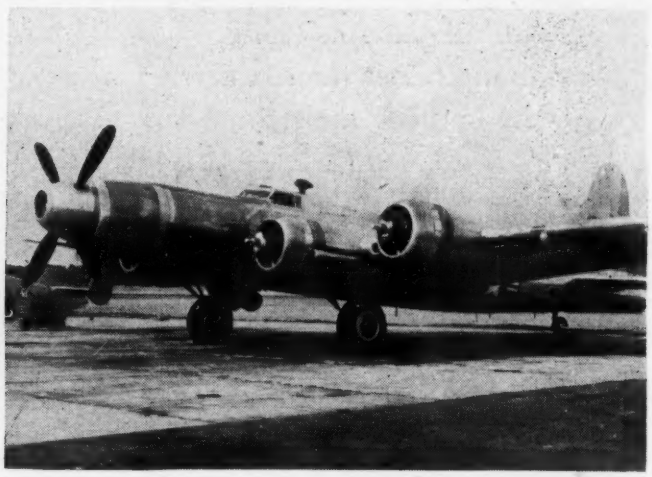
Lockheed Aircraft Service, Sayville, L. I., has contracted to do all maintenance and overhaul work for Island Air Ferries, certificated (but not yet operating) New York feeder-line. Island Air Ferries, now doing charter and sightseeing work, is based at MacArthur Field, LAS' location.

Babb Co., New York City, has appointed Arne Larssons Co., Ltd., of Stockholm exclusive sales representative for Sweden. This is the third Scandinavian representative appointed in recent months, the others being in Denmark and Norway.

General Controls has established a new St. Louis office, with B. L. Lerch as factory branch manager; and a new Oklahoma City office with O. D. Shaddox named as factory manager in St. Louis.



Wright Aeronautical Corp. is testing its 5500 hp. T-35 Typhoon Turboprop in B-17 nose. Note gas turbine stacks under fuselage.



The T-35 installation in the B-17 necessitated movement of the flight deck aft, extension of nose, and strengthening fuselage.

New Propeller Engines for the Air Force

Combining best features of jet and reciprocating units, Wright and P&W raise power plant performance.

By combining the turbojet with the reciprocating engine, engineers have long been convinced that a new engine could be created with the advantages of each and without the disadvantages.

The gas turbine is the most effective way known for the conversion of the energy in hot gases to mechanical work. The jet nozzle is the most effective method known for the acceleration of a fluid to high velocity. The reciprocating engine is the most efficient engine in existence for the conversion of chemical energy in fuel to mechanical work. And the propeller is still the most efficient method of converting power into thrust.

Engineers in the U. S. have been working for more than four years on these principles and only in the last few days have the results of these efforts been officially released for publication. Pratt & Whitney and Wright Aeronautical have taken two entirely different approaches to the problem but both have come up with engines that are substantial improvements over the wartime reciprocating engine.

Wright's T-35 Typhoon turboprop takes turbine thrust generated by the hot gases and puts it into a propeller instead of into a high speed jet, thereby utilizing the high efficiency of the propeller as a thrust generator. Wright's new Turbo-Cyclone 18 utilizes the energy of three gas turbines by gearing output back to the engine crankshaft.

The Pratt & Whitney R-4360-VDT engine represents a distinctly improved version of the powerful Wasp Major to which a variable-discharge nozzle has been added to provide jet thrust.

This latter device adds about 800 lb. thrust to the engine (or a total of 3200 lb. thrust to the Boeing B-54 in which it is installed.

▶**Design Steps**—First step in design of the new model was removal of the engine-driven supercharger and accompanying driving mechanism, a saving of power, weight and complication that increased the takeoff power of the engine to well over 4000 hp., a 15 percent increase. This additional power required strengthening of the crankshaft, piston rods, bearings and other internal parts.

Fuel consumption of the new engine has been reduced by the use of direct fuel injection equipment. Bendix Products division injection pump equipment is used, resulting in improved fuel distribution and more accurate control of fuel-air ratio, producing the reduced fuel consumption. In addition, the new low-tension, high-frequency ignition system is used. This system was developed by Scintilla Magneto division of Bendix Aviation Corp., and utilizes transformer spark plugs and a combination magneto-distributor unit.

▶**G-E Supercharger**—The General Electric CHM-2 turbosupercharger is used to provide high density air through an intercooler to the air metering unit at high altitudes, enabling the B-54 to develop sufficient power for operation above 40,000 ft. An innovation in the new engine and one from which it derives its name is the use of a variable-area nozzle on the turbo outlet.

Whereas previous turbo installations have exhausted the hot gases to the atmosphere, the new design expands these gases through a nozzle to provide the jet thrust. From this Variable Discharge Turbine comes the VDT name.

The variable area nozzle is automatically controlled through a pressure-operated actuator which maintains a constant relationship between tailpipe and atmospheric pressure.

By control of the exhaust nozzle area, control of the back-pressure on the turbine is obtained. This in turn, determines the amount of supercharging given the intake air furnished the engine and, therefore, its power to a considerable extent. Direct control of engine output is, of course, determined by the fuel injection rate.

▶**Closed System**—The VDT is virtually a closed system resulting in operation of the turbine and jet nozzle at all times. For this reason engine speed must be restricted at takeoff and altitudes up to about 8000 ft. to prevent excessive manifold pressure. This situation also extends to the jet nozzles, which are inefficient at the takeoff and climb speeds of the B-54. Thus, the new bomber does not exploit the full advantages of the new VDT engine until an altitude of 8000 ft. and an airspeed of 375 mph. are reached.

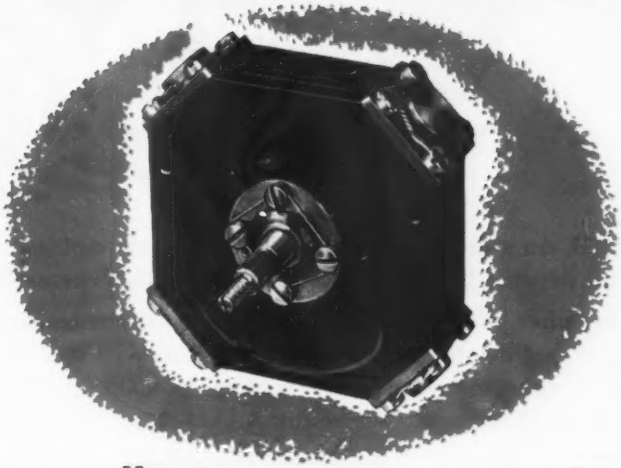
HEADQUARTERS FOR HYDRAULIC VALVES

Bendix-Pacific, since 1938, has built over 25,000 aircraft hydraulic selector valves of virtually every type. This experience, in no small measure, is responsible today for the industry-wide acceptance of the advanced designs of manual-, motor-, pilot- and solenoid-operated valves for both 1500 and 3000 PSI systems which are now available from Bendix-Pacific.

IN VOLUME PRODUCTION

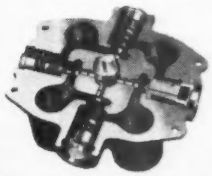
MANUALLY OPERATED 4-WAY

SELECTOR VALVES



High flow capacity—low pressure drop—light handle loads—compact radial design are proven advantages of Bendix Pacific AN-type 4-way valves. They are available for both 3000 and 1500 PSI systems.

Valve 405883 pictured here is a 3000 PSI equivalent of AN 6213-2. Although rated at 3.5 GPM under Specification AN-V-4, it can handle considerably greater flows without excessive pressure loss. Flow areas are oval in cross-section, thus further contributing to higher efficiency without increased size or weight.



Detailed specifications on all Bendix-Pacific valves are available on request.

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New Way to Gage Hovering Performance

Correction factors for root and tip lift losses offer accurate means for estimating copter flight results.

By Paul H. Stanley*

In the past, use of charts and formulas to obtain hovering and translational performance estimates for helicopters generally have given results which flight tests have proved too optimistic.

Recently, a new system of correction factors for root and tip lift losses has been developed for use with the familiar strip analysis method for airscrews.

Application of this system to helicopter hovering flight shows closer agreement between performance predictions and experimental results.

▶ **Analogy Made**—It is generally conceded that rotor tip-loss should be considered in blade-stressing. Cierva made allowance for tip-loss in his Autogiro blade lift distribution diagrams, and a blade root correction was introduced later by the author.

It would seem logical also, to apply these factors in relation to performance characteristics.

In considering the probable nature of the lift-distribution over a copter blade in hovering flight, it is believed there is an analogy between the Lanchester-Prandtl sweep-area-conception for a fixed wing[1] and the operation of the helicopter blade.

In the fixed wing, the sweep-area is taken as a circle whose diameter is the span of the wing, and accordingly, in steady translational flight, the plane of symmetry bisects this circle. For a helicopter blade, in hovering flight, with peripheral velocity varying from zero at the centerline of rotation to a maximum at the blade-tip, it was considered that a virtual plane of symmetry could be located at the radial centroid determined by the elements of blade-chord times corresponding rotational velocity squared. At this point, depth of the sweep-area would be a maximum.

It was further assumed that the variation of sweep-area from this maximum would vary elliptically to zero at the blade-root and blade-tip.

Using a factor of 1.0 at the virtual plane of symmetry, allowance for blade-tip and blade-root losses is then made by applying the factor (in function of radius) corresponding to the proper blade element to the lift calculated for a given (elementary) blade area, lift coefficient, and velocity. Figs. 1, 2, and 3 give the diagrams of correction for blades of rectangular planform, 2:1 taper, and also for 3:1 taper.

It will be noted in the diagrams that the factor is zero at 10 percent radius, since in practical helicopters, the blade-area is usually eliminated inboard of this station.

For airfoils, maximum lift for a specified power input is obtained when $(C_L)^3/(C_D)^2$ is a maximum. This would lead to relatively low tip-speeds in obtaining the maximum hovering efficiency for a helicopter, and in the absence of two-speed transmissions, would impose a very serious limitation on forward speed because of tip-stall of the retreating blade.

For hovering, with a single-speed transmission, it is therefore the practice to chose a value of C_L somewhat lower than that corresponding to $(C_L)^3/(C_D)^2$ max. (say — $C_L = .7$), and to use a small amount of wash-out from blade-root to tip.

▶ **Strip Analysis Employed**—Using the strip analysis, with corrections for tip and root losses obtained from Figs. 1 to 3, a constant value of C_L may be chosen. The induced velocity and induced angles at each station are then calculated, and finally, along with total thrust and torque, the wash-out required and load-grading curve (useful in derivation of blade bending moments) are obtained.

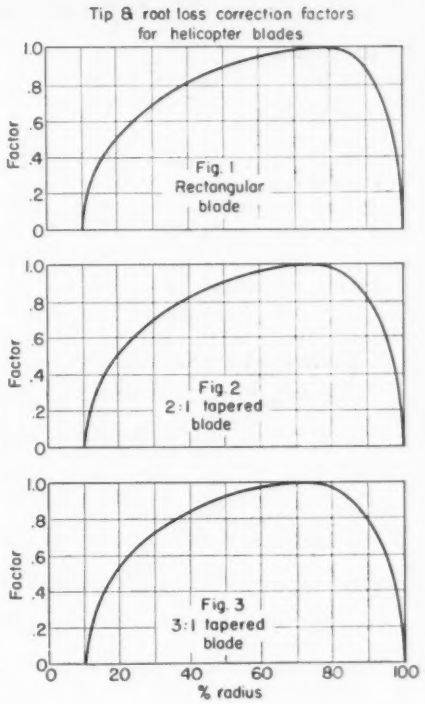
The accompanying table shows the application of the strip analysis, incorporating the correction factors of Fig. 1, to a typical rectangular-planform, three-blade rotor of 40 ft. diameter and solidity of .06, operating at a tip-speed of 400 ft./sec.

It is assumed that desired thrust is approximately 2875 lb. (giving a loading of 2.29 lb./sq. ft. of disk area), and that all blade-sections will operate at a lift coefficient $C_L = .7$.

Increments of 10 percent radius are chosen for calculation of elementary forces, with each station (col. 1) at the mid-point of these increments.

Corresponding peripheral speed, Ωr, is shown in col. 2, and square of this value in col. 3. In col. 4 is given the correction factor F for a rectangular blade (taken from Fig. 1) and the elementary lift, $b \Delta LF$ is shown in col. 5, with elementary drag, $b \Delta D$, in col. 6.

For a three-blade rotor of solidity .06 and 40-ft. diameter, blade-chord is 1.256 ft., and total area, for 3 blades over 10 percent radius is: $\Delta A = 3 \times 1.256 \times 2 = 7.54$ sq. ft. Value of $b \Delta LF$, for C_L of .7 is $.00119 \times .7 \times 7.54 \times (\Omega r)^2 \times F$ and $b \Delta D$ is $.00119 \times .0085$


Tip & root loss correction factors for helicopter blades
Factor
Fig. 1 Rectangular blade
Fig. 2 2:1 tapered blade
Fig. 3 3:1 tapered blade
% radius

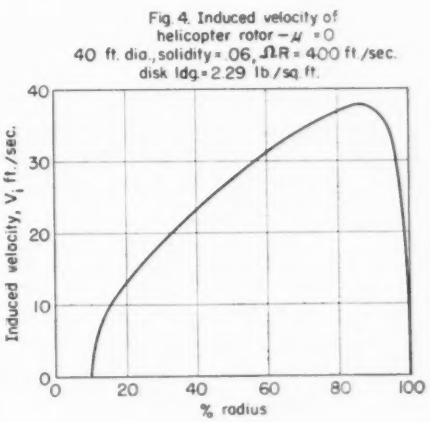


Fig. 4. Induced velocity of helicopter rotor — μ = 0
40 ft. dia., solidity = .06, ΩR = 400 ft./sec.
disk ldg. = 2.29 lb./sq. ft.
Induced velocity, V_i ft./sec.
% radius

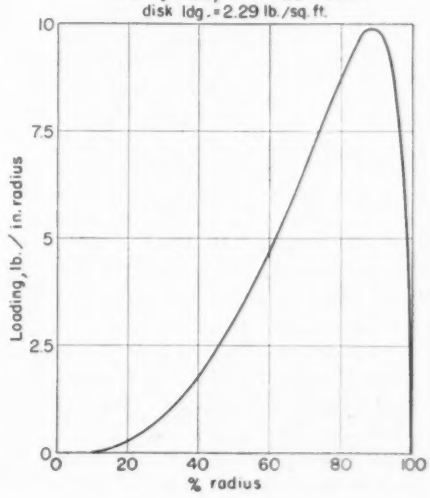


Fig. 5. Load gradient of helicopter blade — μ = 0
rectangular planform — 40 ft. dia.
solidity = .06, ΩR = 400 ft./sec.
disk ldg. = 2.29 lb./sq. ft.
Loading, lb. / in. radius
% radius

* Chief Engineer, Autogiro Company of America.

Hovering Performance, Load Grading and Wash-out Required for a Rectangular-Planform, Three-Blade Helicopter Rotor of 40 ft. Diameter and Solidity of .06

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
$\%_c R$	Ωr (ft./sec.)	$(\Omega r)^2$	F (from Fig. 1)	$b \Delta LF$ (lb.)	$b \Delta D$ (lb.)	Annulus Area (sq. ft.)	V_i (ft./sec.)	ϕ	ΔQ_i (lb.-ft.)	ΔQ_P (lb.-ft.)	ΔT_L (lb.)	ΔT_D (lb.)	Loading (lb./in. radius)
15	60	3600	.37	8.4	.28	37.7	9.7	9°11′	4.0	.83	8.3	−.04	.115
25	100	10,000	.61	38.3	.76	62.8	15.9	9° 2′	30.0	3.76	37.8	−.12	.522
35	140	19,600	.76	93.6	1.50	88.0	21.1	8°35′	98.0	10.4	92.5	−.22	1.28
45	180	32,400	.865	176.3	2.47	113.0	25.6	8° 6′	224.0	22.0	174.8	−.35	2.42
55	220	48,400	.935	284.0	3.69	138.0	29.4	7°36′	414.0	40.2	281.7	−.49	3.90
65	260	67,600	.975	414.0	5.17	163.0	32.7	7°10′	672.0	66.5	411.0	−.65	5.69
75	300	90,000	.997	564.0	6.87	188.6	35.5	6°45′	993.0	102.3	560.0	−.81	7.75
85	340	115,600	.975	706.0	8.80	213.6	37.3	6°16′	1313.0	149.0	701.5	−.96	9.71
95	380	144,400	.675	613.0	11.02	238.5	32.9	4°58′	1010.0	209.0	611.0	−.95	8.46
									Σ:4758.	604.	2878.6	−4.59	

Performance Data from Table:

Torque $Q = (4758 + 604) = 5362$ lb.-ft.

Since 400 ft./sec., for 40-ft.-dia. rotor, is 191 rpm., rotor hp. $= \frac{2\pi \times 5362 \times 191}{33000} = 195.$

Thrust $T = (2878.6 - 4.59) = 2874$ lb. rotor thrust/hp. $= \frac{2874}{195} = 14.75$ lb./hp.

Section drag coefficient Cdo is taken for perfect airfoil in this tabulation. If "standard rough" section is used, $\Sigma\Delta Q_P$ and $\Sigma\Delta T_D$ are increased in the ratio of $\frac{.0132}{.0085} = 1.554$, giving $\Sigma\Delta Q_P = 938$ lb.-ft., $Q = 5696$ lb.-ft., and Rotor hp. $= 207$. $\Sigma\Delta T_D$ becomes -7.14, with thrust $T = 2871.5$ lb., and rotor thrust/hp. $= 13.88$ lb./hp.

$\times 7.54 \times (\Omega r)^2$, where .0085 is C_{do} corresponding to C_L of .7.

Areas of annular sections of the rotor disk corresponding to each 10 percent increment of blade radius are given in col. 7, with the mean induced velocity V_i corresponding to each station in col. 8.

By momentum relations, $V_i = 20.5 \sqrt{(b \Delta LF)/\text{annulus area}}$.

Angle of flow at the rotor disk, ϕ, resulting from V_i and Ωr, is shown in col. 9.

Elements of lift and drag are broken into components which act in the plane of, and also perpendicular to, the rotor disk. When components in the disk plane are multiplied by the arms from centerline of rotation to the stations under consideration, we obtain elements of torque (cols. 10, 11).

Components acting parallel to the axis of rotation of the rotor are given in cols. 12, 13. Finally, the loading per inch of blade radius is shown in col. 14. This is $(\Delta T_L + \Delta T_D)$ divided by number of blades (3), divided in turn by length of a blade-element in inches (24 in this case).

The blade wash-out, from .15R to .95R would be (from col. 9) 9°11′ − 4°58′ = 4°13′.

In Fig. 4, the induced velocity V_i is plotted in function of percentage blade-radius. It is interesting to compare this chart with diagrams showing calculated downwash with experimental check points[2].

Finally, Fig. 5 shows the blade loading, in lb./in. radius, useful in determination of blade bending moments.

References

1. Warner, Edward, P: Airplane Design—Performance, 2nd Edition, p. 90-92, 1936. McGraw-Hill Book Co., New York.

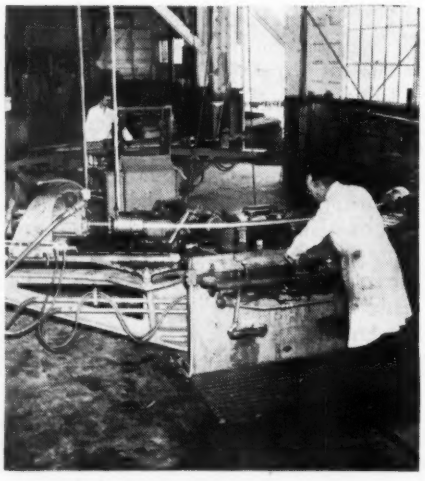
2. Gross, Robert, S: An Investigation of the Airflow Underneath Helicopter Rotors, Journal of the Aeronautical Sciences, December, 1946.

Heavy Extrusions Now Stretch-Formed

The stretch-forming operation, used widely in the past few years for handling sheet metal parts, is now being employed for the forming of heavy extrusions in aircraft.

A sub-contractor to several airframe manufacturers—Vic Patushin Industries, Inc., Inglewood, Calif.—is now using two Hufford stretch presses for forming North American B-45 jet bomber fuselage frames and other extrusions.

Ends of the extrusion are clamped between the jaw components of two actuating cylinders which are mounted on heavy swinging arms, and after alignment the cylinders are energized to place tension on the part. This tension



is slightly below the elastic limit of the extruded material.

Following this pre-stretching, a third cylinder is energized to swing the arms in such a manner that the stretched extrusion is bent around the form.

This method possesses important advantages over the previously used "cold-forming" method. In the stretch-forming procedure, equal pressure is exerted at all points in contact with the die, thus eliminating wrinkling at the point of curvative and permitting maintenance of close dimensional tolerances.

The extrusion, being under tension approaching the elastic limit, attains permanent set during the operation, thereby preventing spring-back, warping and dimensional inaccuracy.

The material is work-hardened only slightly, but this hardening is evenly distributed over the entire length, eliminating localized strains. Both tensile

strength and yield point are raised considerably higher than the original values.

A major factor is reduction in tooling costs and great saving in time over the previous method. Dies are made of Masonite, laminated-sheet Kirksite or steel, depending on length of production run.

Since the stretch-form method requires but one operation, output is increased to as high as 50 parts per hour. Once stretching and bending pressures have been established, the machine produces identical parts rapidly.

Plastic Plane

Maryland firm working with new method that resembles casting.

A new process aimed at the fabrication of a reinforced all-plastic airplane is under development at the Golladay Aeronautical Laboratory, Cumberland, Md.

Present research is concerned with selection and testing of various types and combinations of thermosetting resins.

Plans call for the building of a portion of a full size plane for various tests to establish a basis for structural analysis and formulas. Once the successful procedure is frozen, work is scheduled to begin on the airplane proper. The new process and the reinforcing materials are reported to be very different from the work performed at Wright Field in connection with the plastic construction for aircraft parts.

▶**Molds for Heat**—Instead of using heat and pressure to cure resin-impregnated glass cloth, the new procedure will use molds in a method approaching a casting operation.

Laboratory work to date has shown that a chemical cure (using the heat of a chemical reaction instead of externally applied heat in the form of an oven or infra-red radiation) may be possible.

Also, results of tests show that it may be possible to effect automatic distribution of reinforcing material throughout the resin. This material is reported to be new in relation to reinforcement of aircraft structure.

The wings, including skin and spars, as well as the fuselage and tail surfaces will be constructed by the molding process. The surface is expected to be glass-like and free from waviness for maximum aerodynamic characteristics.

▶**Time-Saving**—The most promising advantages of this type of construction is claimed to be great reduction in man-hours consumed in manufacturing and the reduction of time required to develop a new type or model of aircraft and get it to the mass production stage.

In comparison with present-day sheet metal construction requiring many thousands of parts and fasteners, and extensive designing, drawing, analysis and checking, structure of the reinforced plastic plane is expected to have very relatively few parts—perhaps under 30, depending on type of craft.

Preliminary tests are reported to have shown the new reinforced plastic material to be moisture-proof, rotproof, lightweight, and tough, and possessing good shock absorption.

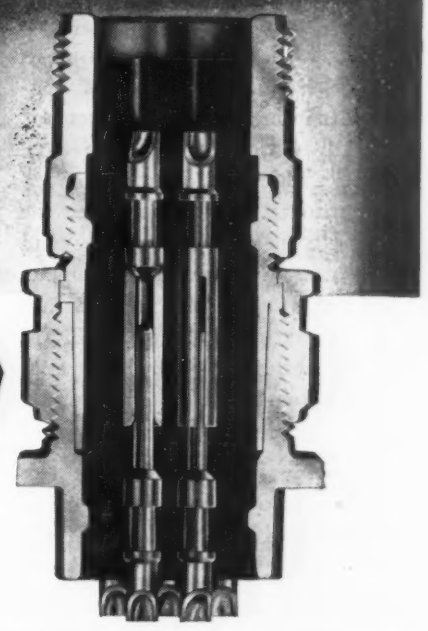
▶**Jet Power**—Several designs are being considered for the first airplane, and are dependent, somewhat, on the possibility of release by the military of certain small jet engines. These airplane designs have been developed by Derr Golladay, director of the lab, who has been associated in the past, in the engineering departments of Fairchild, Martin, Consolidated Vultee, Curtiss-Wright, McDonnell, and Aircraft division of Armstrong Cork Co.

It is possible that a personal type plane will be used for the original research ship, using the new NACA low drag series of airfoils and full span flaps with spoiler ailerons to combine high speed flight and low landing speed.

BENDIX-SCINTILLA

ELECTRICAL CONNECTORS

the finest money can buy

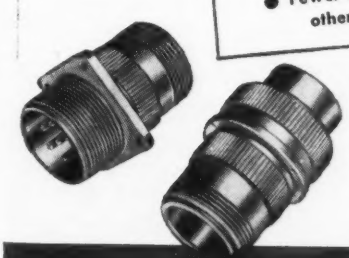


THESE ARE THE FEATURES THAT HAVE MADE IT *the* QUALITY CONNECTOR

- Moisture-proof, Pressure-tight
- Radio Quiet
- Single-piece Inserts
- Fewer Parts than any other Connector
- High Arc Resistance
- Easy Assembly and Disassembly
- Vibration-proof
- Light Weight

Available in all Standard A. N. Contact Configurations.

Write our Sales Department for detailed information.



Plus this Important Advantage—

PRACTICALLY NO VOLTAGE DROP! Contacts that carry maximum currents with a minimum voltage drop are only part of the many new advantages you get with Bendix-Scintilla* Electrical Connectors. The use of "Scinflex" dielectric material, an exclusive new Bendix-Scintilla development of outstanding stability, increases flashover and creepage distances. In temperature extremes, from −67° F. to +300° F., performance is remarkable. Dielectric strength is never less than 300 volts per mil. Bendix-Scintilla Connectors have fewer parts than any other connector on the market—and that means lower maintenance costs and better performance.

*TRADEMARK

BENDIX SCINTILLA

It's

SNAP-IT-TRIM

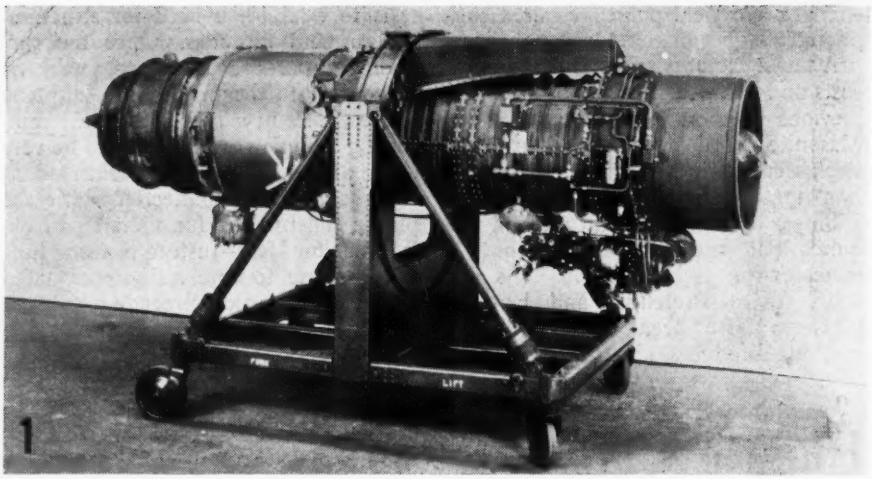
handy attaching device for fabrics

Here's an ingenious gadget for securing fabrics quickly and easily to any surface. SNAP-IT-TRIM consists of a metal tab strip, attached directly to the surface to be covered, and a plastic moulding. The covering material is stretched over the tabs (no pre-piercing necessary) and the decorative moulding snapped on. Ideal for retaining cabin linings or insulation, SNAP-IT-TRIM holds fabric firmly in place, yet is readily removable to clean or replace coverings.

Monadnock also manufactures FABRI-LOC fabric retainers, Adams-Rite WEDJITS, AIRLOCS, SOL-A-NUTS . . . has a wealth of experience in the fastening field. We welcome inquiries from manufacturers seeking reliable development and production facilities.

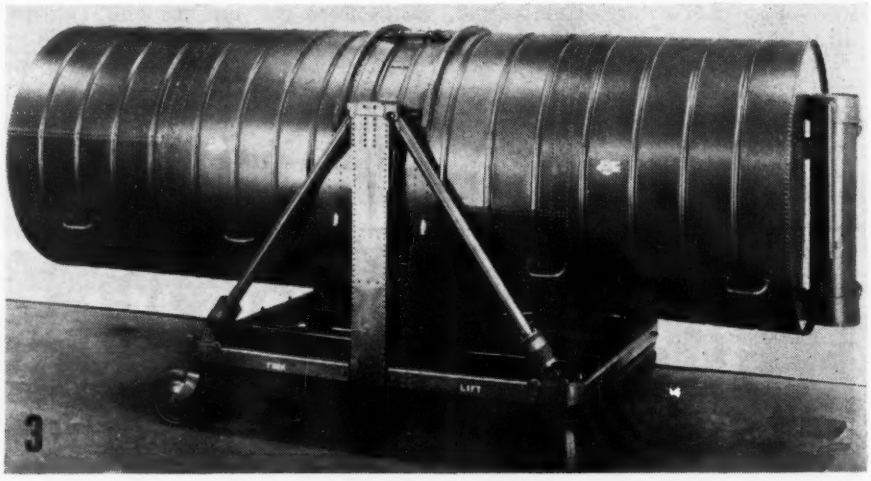
MONADNOCK MILLS San Leandro California

subsidiary of UNITED-CARR FASTENER CORP.

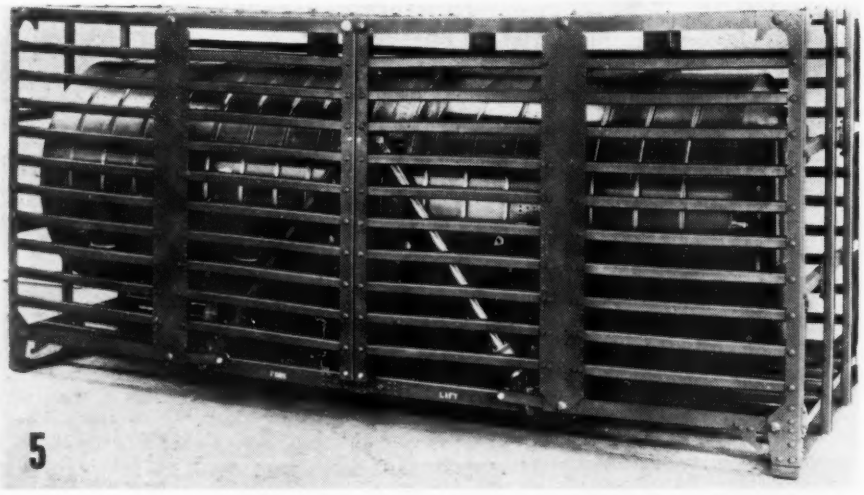


Working under Navy development contract, Edo Corp., College Point, L. I., devised three-part method to prepare jet engines for better, safer shipment by either surface or air. First is stand that can be used also as engine overhaul and run-up stand.

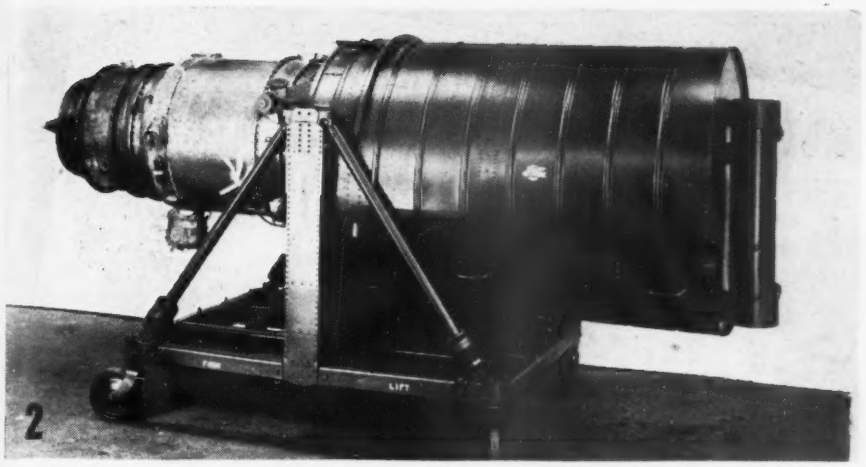
Jet Engine Shipped Safer...



With other end of Westinghouse engine enclosed, whole unit can be shipped by air, stand and all, no further protection being considered necessary. Container now is being fitted for pressurization to preserve constant temperature and humidity.

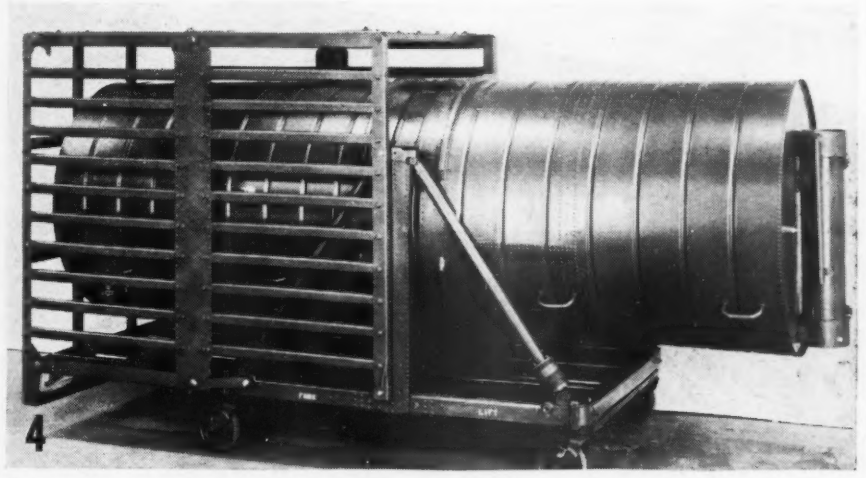


Packaging process is complete when other half of cage is bolted on and wheels removed and stored inside. Load is suspended in center, entire weight resting on skids at each end of cage. Skids also serve to keep cage off floor.

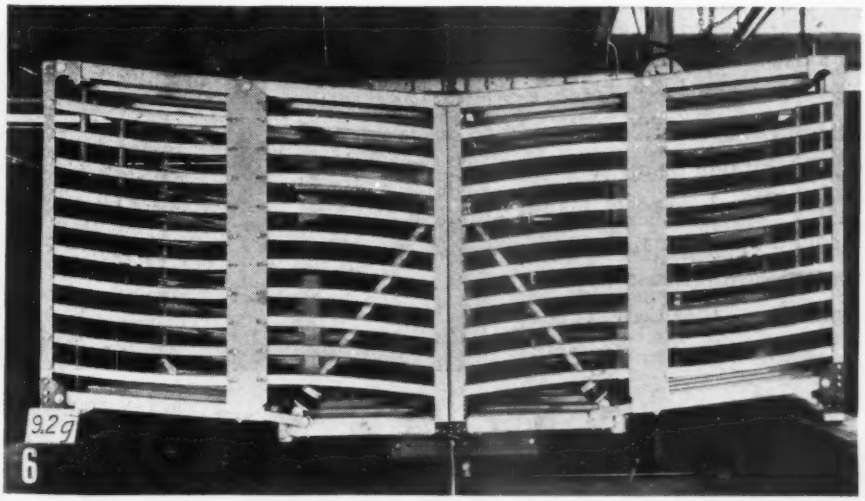


Second unit is protective can which keeps out dirt and moisture. Engine remains on stand and half of can is slipped over end of engine and latched. Can is constructed of aluminum alloy for light weight. Vertical tube is "breathing" device.

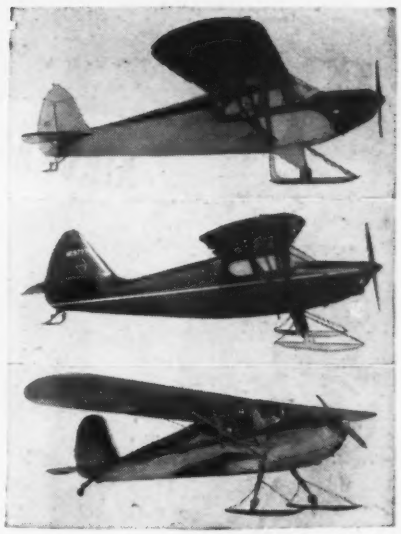
...By New Packaging Method



If engine is to go by surface transport, can is left on and aluminum-strip "elastic" cage is added. Each half of cage is fastened to the stand by only three bolts per side. The horizontal members of the cage function like leaf springs.



Protection afforded by the elastic cage is graphically shown in this photo of test with a 9.2G load imposed. Cage bends, but force would not be transmitted to engine. The container weighs 815 lbs., 1000 lb. less than wooden crate usually used.



Equip with **FEDERAL ALL-METAL SKIS**

Increase Airplane Revenue

In winter, many new sources of income from Ski-plane operations are possible. Organized hunting, fishing, skiing, sleighing and other winter sporting events, will add new flying pleasure and stimulate enthusiasm for year around flying.

Increase Airplane Sales

Business concerns, farmers and ranchers can be interested in airplane ownership as a business necessity when shown that it is practical, economical, and safe summer and WINTER.

Go to businessmen in your community. Analyze their personnel travel requirements. Tell them how an airplane will economically, safely and conveniently handle transportation of personnel at low cost and minimum travel time.

Increase Airplane Rentals

Don't let snow stop winter flying operations. Equip your planes with skis and make winter flying hours turn in a profit.

Stimulate winter flying interest among students, pilots, sportsmen, businessmen, salesmen, field servicemen, etc. who do not own their airplane. Encourage, more charter trips for sales, service, emergency deliveries.

When heavy snowfalls stop other means of transportation, you can get there with airplanes equipped with Federal skis.

Increase Student Training

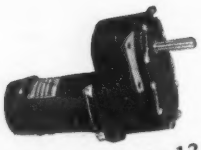
There are more good flying hours in winter, for airplanes equipped with skis than in summer for airplanes equipped with wheels. Encourage and promote student flying through the winter months, when other outdoor activities are minimized. Organize social groups among high schools, colleges and business concerns. Have them meet socially at the airport. By providing entertainment facilities, you can stimulate interest in winter flying. A few meetings and demonstrations of the fun of flying in the winter on skis will keep your planes flying profitably throughout the winter.

Increase Flying Safety

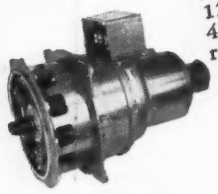
Federal Skis are low cost insurance. Almost any area large enough to land an airplane is a safe and satisfactory landing field in winter for ski equipped aircraft.

FEDERAL
AIRCRAFT WORKS
MINNEAPOLIS 12, MINN.

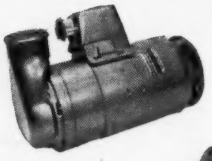
AIRCRAFT MOTORS AND GENERATORS



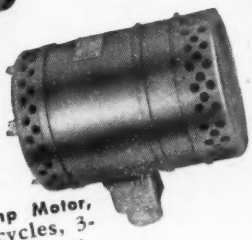
Wing Flap Actuator, 12 v, d-c—1/50 hp interm., 10 rpm.



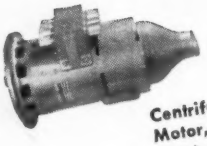
Constant-Frequency Alternator, 40 kva, 120/208 v, .75 P.F., 400 cycles, 6,000 rpm.



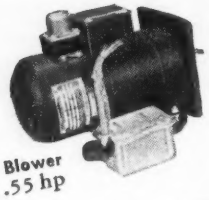
Variable Speed, D-C Generator, 30 v, 9 kw, 30 v, d-c, 300 amps, 3,000/9,000 rpm.



Hydraulic Pump Motor, 208 v, 400 cycles, 3-phase, 7.5 hp cont., 11,500 rpm.



Constant-Speed, D-C Generator, 24 kw, 30 v, d-c, 800 amps, 6,000 rpm.



Centrifugal-Type Blower Motor, 27 v, d-c, .55 hp cont., 7,500 rpm.

There's a drive for every flying job—and a generator to supply the power—in the complete line of Westinghouse motors and generators. Built to exacting specifications—and tested under actual flight conditions—these units give you the proper combination of dependable performance and minimum weight. The units pictured are just a few to indicate the range of application, the speeds, frequencies and power available in both motors and generators.

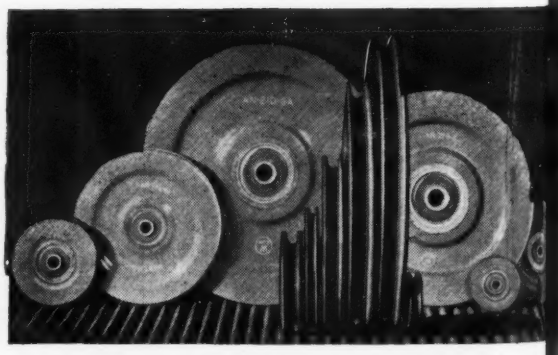
PLANE PERFORMANCE • FLIGHT SAFETY • GROUND OPERATIONS

You can improve all 3 with products like these . .

The building of a variety of products for aviation is a big business at Westinghouse. Some of these products are new . . . others are refinements . . . and all owe their wide acceptance to a superiority achieved by constant research and development. In any one or all of these products, you will spot opportunities to improve plane performance and flight safety or boost efficiency in ground operations.

For more information, call your nearest Westinghouse office or write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

J-94774



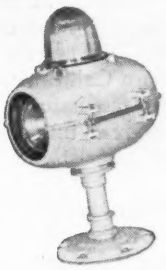
Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

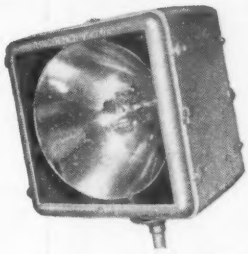
AIRBORNE

ALL-WEATHER AIRPORT LIGHTING

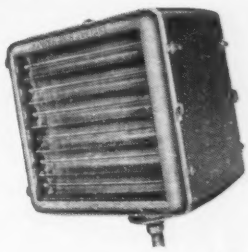
Here's another Westinghouse development designed to remove the hazards imposed on aircraft by "ceiling zero" conditions. This approach lighting system is visible through 1,000 feet of the thickest weather—when objects 50 feet away cannot be seen. It's the long-awaited landing aid that takes up where radio direction ends. Its principal units are shown below.



High-intensity Runway Light . . . a new light designed to provide better runway indication under any visibility condition. It contains 3 separate light sources, one medium-intensity and two high-intensity, independently controlled, with ten steps of brightness.

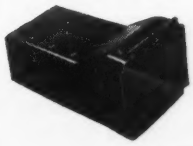


Flash Unit . . . employs a Krypton lamp having a maximum brightness of over 9 million candlepower per square inch. This is magnified by the optical system to give the unit a candlepower range of 1,000,000 to over 3,000,000,000.



Blaze Unit . . . contains 6 straight, stroboscopic-type tubes with an effective length of about 2 feet. Steady burning brightnesses range from 100 to 10,000 candlepower and flashing brightnesses from 100,000 to 10,000,000 candlepower.

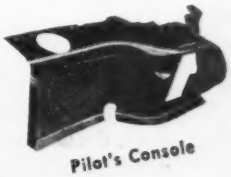
MICARTA "444"



Glove Compartment

Radio Speaker Baffle

Instrument Mounting Bracket



Pilot's Console

This tough, versatile laminate offers you the opportunity to increase aircraft payloads with stronger, lightweight parts. Production of Micarta parts is simple, fast and economical because it can be formed easily into intricate shapes with inexpensive equipment. It is resistant to heat, cold, humidity and chemicals and can be easily machined with ordinary tools. It is only half the weight of aluminum, yet nearly its equal in compressive strength. Above are a few aircraft applications.

Micarta Aircraft Pulleys

A natural for aircraft duty, Micarta pulleys provide real dependability in the vital function of cable control. Their use on all types of aircraft has long been approved by the Army, Navy and CAA. Lightweight and tough, Micarta pulleys cause practically no wear on the cable, with a minimum of wear on themselves, thus assuring long life for both cable and pulley. They are available in a wide range of standardized sizes for every type of cable control from engine to rudder.

Battery Chargers

Rectox mobile battery chargers are available for outdoor use on 115/230-volt circuits for charging 6 or 12-cell airplane batteries. The units are self-regulating and self-protecting. Adjustment of charging rate is simple.

Engine Starters

Completely self-contained in a weatherproof steel cabinet, the Rectox engine starter is wheel-mounted for easy portability. It delivers full output voltage instantaneously and maintains high efficiency over a wide load range.

Leader in Aviation Equipment

ON THE GROUND

ENGINE STARTERS, BATTERY CHARGERS • AIRPORT LIGHTING • TEST EQUIPMENT • RADIO AND MICROWAVE APPARATUS • LAMPS

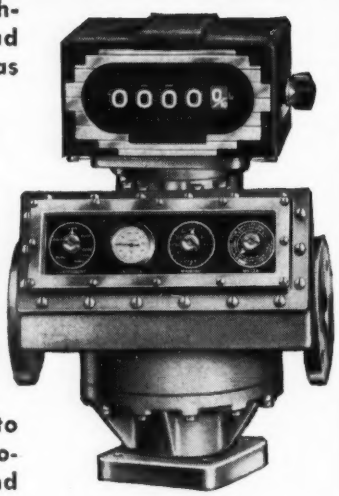
NOW . . . SAY GOOD-BY TO THE OLD "CUT and TRY"

The *NEW* Granco Temperature Compensating Meter AUTOMATICALLY maintains correct weight and balance limits during air craft fueling . . .

Bucketing out a gallon of gas, weighing it, then calculating the full load weight limit is now as out of date as fueling with a hand pump!

The new GRANCO Temperature Compensating Meter *automatically* gives you your fuel load weight *in pounds* no matter where the mercury stands on the airport thermometer. And does it with speed and precision.

The Model TE GRANCO will compensate for temperature fluctuations from zero to 220 degrees F., or liquids having a range of .0003 to .0009 coefficient of expansion. It automatically allows for expansion and contraction and computes all measurement back to 60° F.



Model TED (2"). Also available in 2½", 3", 4" and larger sizes.

LASTING, ACCURATE PERFORMANCE

The GRANCO Temperature Compensator is built into the meter itself and is at all times in direct contact with liquid measured. It reacts instantly to any fractional temperature change, requires no expert handling, no cleaning and is not affected by grit and dirt. Since there is nothing to wear, the Temperature Compensating device will last the life of the meter.

GRANCO Meters are noted for longevity and sustained accurate performance. The new GRANCO TE Meter has these qualities, plus the unique automatic Temperature Compensator.

Send for working drawings, specifications and installation data today!

Please send me complete information and working drawings of your new GRANCO Temperature Compensating Meter. I understand there is no obligation.

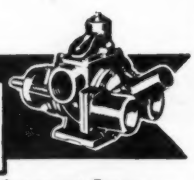
NAME_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

Granco



GRANBERG CORPORATION
Oakland 8, California

Also makers of Granco Rotary Positive Displacement Pumps

Jet Overhaul Activity Expanded at Navy Base

The new jet engine overhaul facility at Alameda Naval Air Station, Calif., is planned for eventual expansion into the largest such installation in the nation. The center is also designed to accommodate jet aircraft overhaul.

Location of this strategic activity is intended to place it in proximity to West Coast aircraft manufacturers and the Navy's jet aircraft flight training bases in southern California.

It also will facilitate air supply to Pacific areas at such time as carrier and land-based jet aircraft are assigned to those bases.

The Alameda facility is presently operating an overhaul line for General Electric-Allison J-35 turbojets used in the North American FJ-1 fighters stationed at North Island Naval Air Station, San Diego, Calif. This engine is also used in the Douglas D-558-I research airplane.

At present, only one building is used for the J-35 overhaul but other buildings are being tooled up for the assembly-line overhaul of Westinghouse 19-B (J-30) and 24-C (J-34) turbojet engines, the latter scheduled to be more widely used in Naval jet aircraft than the J-35 turbojet.

To supplement the overhaul activity, a special jet engine maintenance and overhaul training school was initiated at Alameda this summer. The training program has been accelerated to accommodate the 5550 enlisted men already assigned to the school.

The course originally embraced 60 hr. of instruction but has since been condensed into an intensive program covering 20-hr.

Limited Production Found Most Expensive

In terms of airframe pounds cost, "limited production" of aircraft for the armed services is the most expensive way to buy them.

To buy two experimental flight articles plus a static test airplane of a new type costs the services $232 per pound of contractor-produced airframe. Increase this order to 30 production models plus the three prototypes, and the price drops to only $72 per pound. Buying a substantial procurement quantity of 100 of these airplanes plus the three prototypes would cut this cost to $46 per pound. But a graphic index to the economy of mass production is seen in the fact that 500 of these airplanes plus the three prototypes would cost the services only $14 per airframe pound.

Some Short jottings for airline operators, charter companies, and V.I.P.s

The Sealand in flight—preliminary tests successful

The Sealand steps out . . .

Successful flight trials

On January 22nd, the prototype Short Sealand made its first water take-off at Belfast after a series of engine runs ashore and afloat.

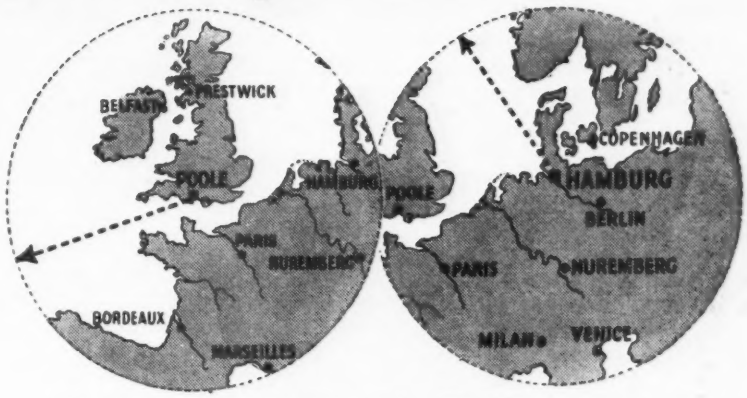
The preliminary flying tests were so satisfactory, that it has been decided to go forward to complete fitting-out without further tests being necessary.

Good news . . .

Good news for all who have sent in enquiries about the Sealand is that the first delivery is expected to be made during the Summer.

The Sealand is the ideal all-purpose amphibian, being available for such widely varying purposes as executives' communications craft, an airborne office or showroom, a freighter, for ambulance work, feeder lines and charter services. The payload is 1,400 lb. (or 7 passengers and luggage), with petrol consumption of better than 6 miles to the gallon, with a range of approximately 300 statute miles.

The ideal all-purpose aircraft



Sealand maximum range-circle of 776 miles. The Sealand operates from any airfield, or from 900 yards of water

FLYING-BOAT PERSONALITIES

Chief Pilot

JOHN STRANDRUD

O.B.E., *of* D.N.L.

ESCAPING from Norway in 1940 via Sweden, Russia, Turkey, Iraq, India and South Africa to Canada, Captain Strandrud spent some months there training pilots.

He came to England in 1941 and spent three years flying between Stockholm and Scotland with secret agents, political refugees from Norway, and government despatches. For belly-landing a Mosquito without harm to the V.I.P. in the bomb compartment, and for delivering the passenger, in another aircraft, on time in Stockholm, Strandrud was awarded the O.B.E. (Civil).

One of the most experienced and best pilots in Norway, Captain Strandrud is delighted with D.N.L.'s choice of Short Sandringhams for the Norwegian routes.

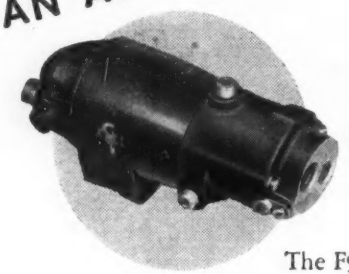
Shorts

THE FIRST MANUFACTURERS OF AIRCRAFT IN THE WORLD

Short Bros. & Harland Ltd., Queen's Island, Belfast

Enquiries to 17 Grosvenor Street, London, W.1

PRIMING THE "PANTHER"
WITH AN ADEL PUMP



#20386-3

The F9F "Panther" newest of the famous Grumman Navy planes, depends on an Adel fuel engine priming pump for starting its powerful "Nene" engine. This priming pump is completely Adel engineered to meet the specific requirements of the F9F. Supplying individually engineered designs for specific aircraft is standard procedure with Adel. Consult the Adel Engineering Sales Department for assistance with your particular problem.

Other Adel products on Grumman aircraft include combustion heater pump, main relief valves and a full line of Adel clips and line supports

For information on all Adel aircraft products write ADEL PRECISION PRODUCTS CORP., 10727 Van Owen St., Burbank, California. • Canadian Representative: Railway & Power Engineering Corp., Limited.

Grumman Albatross

Grumman Mallard

ADEL

ADEL PRECISION PRODUCTS CORP.
BURBANK, CALIF. • HUNTINGTON, W. VA.

Manufacturers of: Aircraft Hydraulic Systems • Marine and Industrial ISOdraulic Controls • Line Support Clips and Blocks • Industrial Hydraulic Equipment • Aircraft Valves • Industrial Valves

Standardization Manual For Drafting Procedures

Standardization of aircraft powerplant, propeller, component and parts drawings, to make for greater production simplification, is being accomplished by manufacturers through the use of the Aeronautical Drafting Manual issued by the Society of Automotive Engineers.

SAE quotes engineers as saying use of the manual makes design drawing clearer and has begun to "standardize the language of the blueprint."

Latest manufacturer to adopt the standardization recommendations is Packard Aircraft division, Toledo, Ohio. More than 1000 firms are using the manual either in part or in whole. At least 48 companies have adopted the manual's recommendation that dimensions be shown in decimals instead of fractions of an inch.

The manual is also being used by engineering colleges as a textbook.

Rift Made in Plant-Wide Bargaining Arrangement

Plant-wide bargaining in the aircraft industry has been cracked by the International Brotherhood of Electrical Workers, A. F. of L. Hereafter, employers who deal with one union in regard to production and maintenance workers can expect the IBEW. to try to carve out a craft unit of electricians—and get help from the National Labor Relations Board.

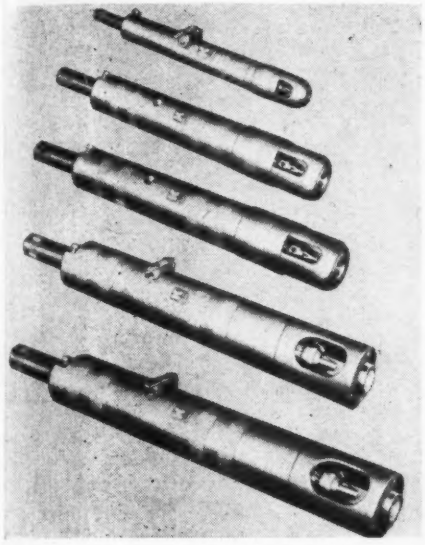
The latest victory was scored by IBEW. at Lockheed Aircraft Corp. plants at Van Nuys and Burbank, Calif., where the International Association of Machinists, aeronautical industrial district Lodge No. 727, has held a contract covering all shop workers since 1937. The A. F. of L. union got NLRB to grant it an election among maintenance electricians, then beat IAM by a vote of 33 to 26.

Now Lockheed will have to deal with IAM as to its production and maintenance force (except electricians) and with IBEW as to the electricians.

Other companies at which NLRB has approved a special bargaining unit of electricians include Douglas Aircraft Co., Bendix Aviation Corp., Luscombe Airplane Corp. and Consolidated Vultee.

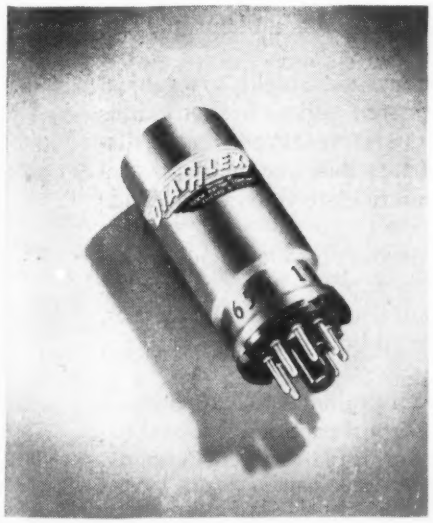
Stimulus for splitting up bargaining units stems from a Taft-Hartley law provision that the NLRB may not decide that a craft unit is inappropriate because of some prior ruling to that effect unless a majority of the employees in the proposed craft unit vote against separate representation.

NEW AVIATION PRODUCTS



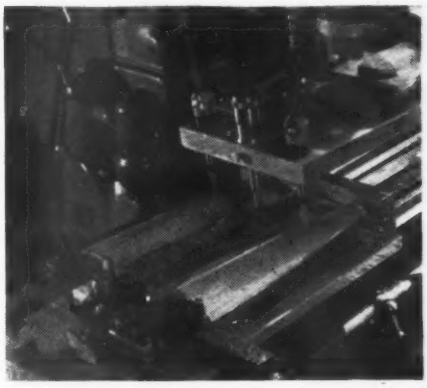
Multiple Drilling Tools

Speed, accuracy, and minimizing of operator fatigue in multiple drilling are claimed for Airfeedrill devices produced by **Keller Tool Co.**, Grand Haven, Mich. Line consists of five major tools to afford 34 speed combinations of stationary and portable units for holes up to ¾-in. in mild steel, aluminum, brass, or plastics. Tool weights range from 3½ to 28 lb. Airfeedrill is combination of air drill, air cylinder and hydraulic dashpot and feed control assembled in one housing and arranged for locking progressively in jig or permanently into fixture.



Time Delay Unit

Applicable in aircraft, scientific and industrial fields, hermetically sealed "Tarrytron" time delay fitted with octal plug-in base is made by **DiaPHlex Div., Cook Electric Co.**, 2700 Southport Ave., Chicago 14, Ill. Settings are available from 1 sec. to 2 min. duration. Unit is reported stable in operation when subjected to 12 G acceleration. Heater currents can be ranged from 6 to 115v., a.c. or d.c. Timing tolerances maintained when device is subjected to ambient temperature changes from −65 to 160 F. range from 3 percent at 1-5 sec. to 10 percent at 9-120 sec. Weight is 3 oz.



For Profiling

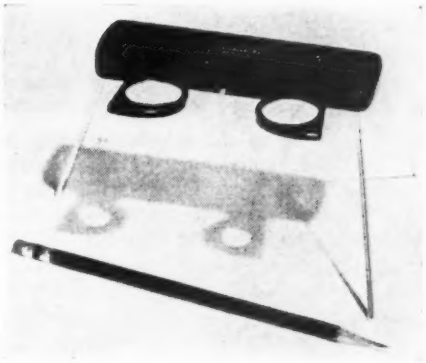
Suitable for profiling blades, model surfaces, form blocks, and tools, duplicating attachment for milling machines is produced by **Aerolab Development Co.**, 1992 Lincoln Ave., Pasadena, 3, Calif. Profile in the vertical direction is obtained by counterweighted platform with micrometer-stopped stylus resting on and lifted by the master. Cutting is done by two high-speed pneumatic routers with ball end mill cutters. Travel in the other two directions is obtained via movement of milling machine table, which is independent of vertically moving arm.

"Free Wheeling" Tube Cutter

New tube cutter, No. 274-F, with ball bearing action is announced by **Imperial Brass Mfg. Co.**, 1200 W. Harrison St., Chicago 7, Ill. Tool is designed for use with copper, brass, aluminum, Bundy steel, block tin and lead tubing, hard or soft temper, and will cut all sizes from ⅛ to 1 in. o.d. Flare cut-off groove in rollers makes it possible to remove cracked flare without waste of tubing. Another feature is retractable locking reamer for use on tubing after it is cut, folding out of way when not in use. Tool feed mechanism is enclosed so that threads are protected against dirt and damage. Body is high strength aluminum alloy.

D.C.-A.C. Chopper

Single-pole, double-throw, electromechanical chopper marketed by **Stevens-Arnold Inc.**, 22 Elkins St., South Boston 27, Mass., converts pure d.c. to pulsating d.c. or a.c. so that output of thermocouples, strain gages, or low level d.c. sources may be amplified by a.c. As rectifier it converts a.c. to d.c. Contact rating is 0.050 amp., 50v. d.c. Coil is rated at 12v., a.c., 10-500 cps., but it's stated this may be increased to 24v. without damage. Unit is hermetically sealed. Seated height is 2½ in., diameter is 1½ in.



For Aerial Photographs

For use by engineers, photo interpreters, and other users of vertical aerial photographs, Model F-271 folding pocket stereoscope is announced by **Fairchild Camera & Instrument Corp.**, 88-06 Van Wyck Blvd., Jamaica 1, N. Y. Three legs fold into recesses of die-cast body when not in use. Meniscus lenses having 4½-in. focal length and 2½ power magnification swivel out of recesses and are adjustable horizontally over range of 50 to 72 mm. Unit stands 4 in. above prints. Overall dimensions are 5¼ × 1⅝ × ½-in. Weight is 7½ ounces.

On the Lockheed Shooting Star

One of the toughest glazing problems ever encountered was the windshield of the Shooting Star. It was solved by "Pittsburgh" specialists, with the flat center panel of bird resisting, bullet resisting Pittsburgh Safety Plate Glass.

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BY "PITTSBURGH"

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When you need Safety Glass for airplanes, bring your problems to "Pittsburgh." Our unceasing research, unexcelled equipment and years of experience in making quality glass are your assurance of satisfaction. Pittsburgh Plate Glass Company, 2402-8 Grant Building, Pittsburgh 19, Pennsylvania.

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FINANCIAL

National Case Has Repercussions

Speculation on whether airline network overhaul is brewing follows CAB dismemberment proposal.

Considerable conjecture continues to surround the action of the Civil Aeronautics Board in suggesting a possible dismantling of National Airlines. This bold proposal has created considerable confusion among the air carriers as to the possible consequences and the ultimate objectives of the Board.

Some observers see an effort by the Board to assume the initiative in attempting to reshape the airline network, with fewer but stronger carriers emerging. Others believe it represents an isolated instance with CAB attempting to correct an unwholesome situation created by a strike-embroiled airline.

▶**Likelihood**—There may be some truth in both contentions. Of greater consequence, the likelihood of accomplishing either of these objectives by the present action is considered very slim. The Board may prod, but it appears that it cannot legally force National to dismember itself.

Almost unnoticed in the present action is the shift in the Board's philosophy toward suspension of certificated routes previously granted. In March, 1947, largely at the behest of then Chairman James M. Landis, the Board instituted an investigation of whether it was in the public interest to suspend indefinitely certain routes previously granted Chicago and Southern Air Lines in the Caribbean area.

▶**Dissent**—In a concurrent mail rate action, Landis strongly dissented from the majority decision granting C & S a temporary rate increase amounting to 95 cents a plane mile. In this instance, Landis proposed to use the rate of mail pay as a device to rearrange the airline map, bringing order out of a chaotic duplication of route mileage.

The majority of the Board disagreed with this approach, maintained the high mail subsidy rate and in a subsequent action, in April, 1948, terminated the proceeding involving the investigation of the routes concerned, confirming the previous award. The majority were reluctant throughout to suspend any certificate previously granted.

▶**Comment**—In his dissent of March, 1947, on the C & S mail pay award, Landis significantly commented: ". . . Certainly, the United States is not bound for all time by awards that may have been made, nor is the Board under the Act helpless to correct its mistakes and to liquidate, without undue hurt to all involved, an investment that may have been made on the strength of an award."

CAB unquestionably can bring indirect pressure on an airline through the amount of mail payments it may award or withhold. Presumably it was this method that Landis proposed to apply. The Board's power to revoke a certificate of public convenience and necessity on strictly legal grounds remains a tenuous issue.

▶**Variance** — The present members of the Board are in decided variance as to their views on this question. As recently as July 23, 1948, in re-affirming its previous award of the Kansas City-Memphis route to C & S, three members of the Board, constituting a majority, declared: "We have grave doubts, however, as to our possession of such power [to revoke upon reconsideration a certificate] . . . and in future cases of this kind, except where national security or other urgent considerations dictate otherwise, we shall pursue a policy of making the certificate effective on such date as will permit reconsideration without creating the legal problem raised in the present case." Such were the views of Board members Ryan, Jones and Adams.

▶**Another View**—In a dissenting opinion, the minority, Chairman O'Connell and Member Lee in this instance, declared, "Nor do we share the doubts apparently entertained by the majority as to the Board's power to revoke, upon reconsideration, the certificate previously awarded to Chicago & Southern."

The Board's power to suspend routes has never been put to the test. Any revisions attempted in this manner will be accompanied by considerable legal wrangling with the final adjudication determined by the courts or ultimately resolved by Congress.

▶**Not Exempt**—Should the Board continue in the attempt to remake the airline map, other carriers are not exempt from investigations threatening the rearrangement of their route structures. This now may be the Board's answer in attempting to eliminate the chaos caused by the rapid duplication and triplication of route mileage granted in more optimistic times.

CAB's statement that the National investigation will further its study of the air transportation system lends credence to the belief that other route realignments are being given some consideration. In all probability, however, the Board may be inclined to move cautiously on any similar moves until the legal questions surrounding the National investigation are more completely resolved.

▶**Rescinds Order**—Almost overlooked in this pattern is the Board's supplemental opinion in the Middle Atlantic Area case, issued Aug. 26, 1948, which rescinded a previous order permitting Capital Airlines to offer non-stop service over certain key segments of its routes between the Chicago area and New York. The area is highly competitive by virtue of the existence of other air carriers.

To add to the confusion, Capital is continuing to render special non-stop service under a special exemption order which has the purpose of suspending the rescision order until the Board completes its investigation of the carrier's right to permanent authority for such operations.

▶**Provocation**—It is possible that the Board instigated the National investigation to provoke that carrier into a merger or series of mergers. It is known that Delta and National have been discussing a possible combination. Other carriers have also toyed with the idea of merging with National. In all instances, however, it is believed that the question of price has been the main stumbling block.

The Board action, rather than breaking any merger stalemate, may have exactly the reverse effect. With National's franchise now under investigation, other carriers may be reluctant to acquire an intangible asset which may be subject to considerable litigation.

▶**Terms**—Certainly, it is going to be very difficult for the Board to impose dismantling terms for National's routes. What are the "just and reasonable" terms to be paid by the other airlines for National's physical assets and intangible but valuable franchise? National, an unwilling party to its own funeral, is not likely readily to consent to any proffered terms.

Further, should the Board sanction any purchase price of National's route segments, it may assume an obligation to amortize such purchase through "adequate" mail pay to the buyer.

The Board's investigation of the National proceeding may have a constructive application, but it has opened up many ramifications with the ultimate results much in doubt.

—Selig Altschul

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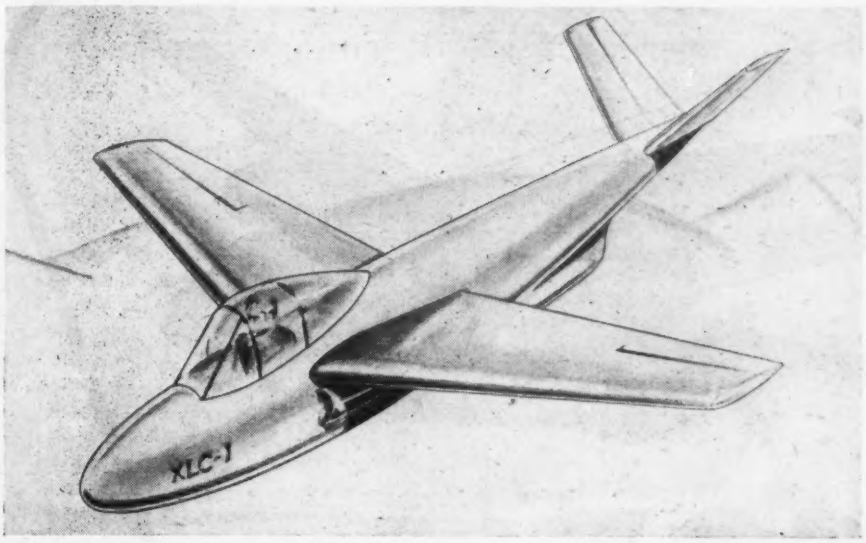

Two personal planes have developed from World War II target drone planes, and this new jet one-placer, whose immediately possible use is primarily as a radio-controlled target craft, might likewise be a forerunner of a jet personal plane. The sketch shows design study of the one-placer, which is being developed at Cal-Aero Technical Institute, Glendale, Calif. Its 240-lb. thrust jet engine also is being built there.

Cal-Aero Designs Midget Jet

Low-cost craft, suggested for possible military use as a drone, may show the way to a personal jet plane.

Forerunner of possible future jet-powered personal planes is a single-place jet airplane design now being developed by H. G. Nicholson, director of training at Cal-Aero Technical Institute, Glendale, Calif. Powered with a 240 pound thrust-turbojet engine, also produced by Cal-Aero, the airplane is scheduled for completion within the next year, with engine tests scheduled early next spring.

A primary advantage of this plane would be the fact that the powerplant cost, a large factor in any reciprocating-engine powered small plane, would be lowered because the engine was produced by the plane manufacturer and was made largely from surplus supercharger parts.

▶**All Metal**—Plane design calls for all-metal construction using a butterfly or V tail and a double taper wing. Air intakes for the engine are in the sides of the fuselage, just behind the cockpit; exhaust is at bottom of fuselage, forward of the tail assembly. Engine is behind pilot.

Nicholson quotes estimated performance figures for the single-seater as top speed of 250 mph. with cruising speed only slightly less, range of 325 miles, 1380 ft./min. rate of climb, and fuel consumption of 75 gal./hr. Due to the light weight of the engine, the plane would be able to carry a larger proportion of fuel.

▶**Wingspan**—Plane is to have 20 ft. 10 in. wingspan, overall length of 17 ft. 1 in. and overall height of only 5 ft. 11 in. Gross weight is set at 1278 lb. Landing gear is of "bicycle" type, with two main wheels set in tandem along the centerline of the fuselage and two outrigger wheels on the wings for balance.

Originally drawn up as a project for Cal-Aero engineering classes, the design is seen as an interesting prototype for possible future production aircraft.

▶**Drone** — Nicholson visualizes the speedy midget plane as a possible target drone for military use, with advantages over currently used drone craft in its low cost and superior performance.

If certification can be obtained on the jet engine, manufactured of surplus type B supercharger parts, the engine could be produced cheaply enough to make it an interesting potential personal plane powerplant.

▶**Possibilities**—No personal aircraft in the lightplane class has yet been developed with a jet powerplant, but the prospect of low engine cost has intrigued aircraft engineers in this field ever since the first jet plane was announced.

Dr. T. P. Wright, vice president of Cornell University and former CAA administrator, predicted four years ago in a Washington speech that the eventual choice of a low cost personal plane powerplant would be a form of jet engine, when this type of propulsion had achieved the reliability necessary for personal plane operation.

Work on the plane has progressed to mockup stage. The engine is the latest in a series of small jet powerplants produced from surplus materials and is expected to possess endurance qualities considerably surpassing others developed at Cal-Aero shops in the last four years of continuing development in this field.

Convair Gives Up Flying Auto Rights

Acquisition of the four-place Consolidated Vultee flying automobile and all further rights to its development has been announced by T. P. Hall, designer of the airplane-auto, at San Diego.

Hall said that more than $800,000 had been expended in development of the unconventional roadable plane, and that only some flight testing and minor engineering modifications remain before it will be ready for production. He is considering several propositions for its further development.

▶**Contract Terms**—Hall signed a contract two years ago with Convair for development of the roadable plane. After development expenditures were stopped by the manufacturer, the vehicle and its manufacturing rights reverted to Hall under the contract, when he resigned his engineering position with the company.

The flying automobile includes two components: a modernly styled two-door sedan automobile with a body of laminated glass plastic, powered by a 26.5-hp. Crosley engine mounted in the rear, and a flight component, including wing, 190-hp. Lycoming engine, tailboom and tail assembly, which attaches to the roof of the automobile for flight. Hall reports that flight tests have been "very satisfactory," with the aircraft attaining a cruising speed of more than 100 mph. On the ground the car attains a top speed of 67 mph. and travels 45 miles per gallon. Hall will continue his development work on the project at Gillespie Field, San Diego. The dismantled plane has been moved to a hangar there.

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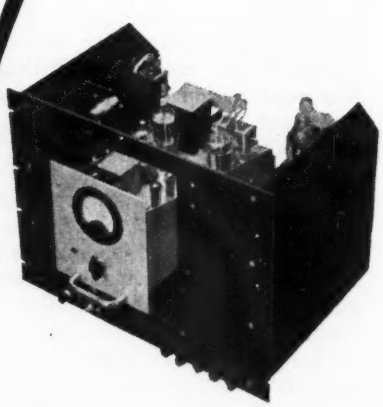

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Domestic Airline Traffic & Revenue

Comparison of First Eight Months 1947 & 1948

Carrier	Rev. Pass. Miles 1947	Rev. Pass. Miles 1948	Net Opr. Income 1947	Net Opr. Income 1948
American	918,815,000	816,743,000	$—2,186,865	$—4,369,231
Braniff	129,720,000	128,202,000	—971,196	—495,330
Capital	191,050,000	180,301,000	—2,444,451	—989,330
Chicago & So.	72,920,000	70,162,000	—646,483	414,853
Colonial	25,199,000	25,112,000	—569,364	1,630
Continental	39,553,000	39,323,000	—298,707	131,981
Delta	138,164,000	122,655,000	—204,126	895,174
Eastern	579,210,000	675,228,000	2,858,681	3,491,256
Inland	18,750,000	17,980,000	120,273	57,362
Mid-Continent	53,711,000	61,840,000	119,602	—15,050
National	111,590,000	52,587,000	—338,320	—1,388,732
Northeast	42,798,000	34,885,000	—814,147	—746,479
Northwest	235,440,000	226,511,000	—1,316,355	—2,720,691
TWA	517,170,000	572,047,000	—3,541,894	—2,097,000*
United	786,907,000	761,169,000	—3,636,406	—2,602,824
Western	125,017,000	73,140,000	30,782	—1,037,076
Totals	3,986,014,000	3,857,885,000	$—13,838,976	$—11,469,487

* *TWA income for August estimated.*

Trunklines Look To Last Quarter

Carriers hope fare discounts and CAB action on mail pay will cut 1948 losses, now near peak level.

With four of the industry's "big five" for in the red, the 16 domestic trunklines have taken near-record losses into the final quarter of 1948.

But the last three months of the year should show improvement over the same 1947 period, when DC-6 accidents and the subsequent grounding brought exceptionally heavy losses to American Airlines and United Air Lines. There is still some hope that the sales appeal of recently instituted fare discounts can boost 1948 passenger volume to last year's level. And CAB action on pending mail rate cases may brighten the picture substantially.

▶ **Eight-Month Deficit**—An AVIATION WEEK survey covering the first eight months of 1948 shows the 16 domestic trunklines with an estimated $11,469,487 operating deficit. In the same period last year, when losses were heading for an all-time peak of over $20,000,000, the operating deficit aggregated $13,838,976 for eight months. Net losses thus far this year have been running neck-and-neck with 1947 because the carriers are now getting considerably less benefit from federal tax carrybacks.

Passenger volume handled by the domestic trunklines in the first eight months of 1948 lagged behind 1947's level by more than 3 percent. Revenue passenger mileage aggregated 3,857,885,000 through August, 1948, against 3,986,014,000 last year.

United Air Lines, first to report on September traffic, announced that revenue passenger mileage was 6 percent under August and 11 percent below September of last year.

▶ **Profit-Makers**—Six of the 16 domestic trunklines were in the black on Sept. 1, 1948: Chicago & Southern, Colonial, Continental, Delta, Eastern and Inland. At the same time last year only Eastern, Inland, Mid-Continent and Western showed profits.

American reported the largest operating loss during the first eight months of 1948—$4,369,231. In the same period last year its deficit was $2,186,865. Other large domestic operating losses through August of this year were: Northwest $2,720,691, United $2,602,824, TWA about $2,097,000, National $1,388,732 and Western $1,037,076.

▶ **Month-by-Month Record**—Substantial profits have been shown in only two of the first eight months of 1948—May and June. In July, the carriers went into the red again with $931,622 operating loss.

Break-even results were recorded in August.

September earnings may be the best in 1948. American, United and TWA are expected to show sizable profits. Chicago & Southern already has reported $57,446 net income during the month of September.

▶ **AOA in Black**—Meanwhile, American Overseas Airlines is setting the profit pace among U. S. flag carriers. The company balanced a $795,596 operating loss in the first half of 1948 with earnings of $655,960 in July and $628,358 in August. AOA's passenger load factor during the two months of July and August averaged about 69 percent.

TWA's overseas operations continue in the red. Following a $2,484,106 deficit in the first half, the carrier reported a $386,946 loss on its foreign services in July and another loss in August. Load factor during the two midsummer months was registered as slightly under 60 percent.

Pan American Airways had profits on its Atlantic division during July and August on load factors averaging around 66 percent. But summer earnings failed to offset first-half deficits.

▶ **Orient Route**—Northwest Airlines is doing well on its Orient run. After showing $318,315 net operating income during the first six months of 1948, it reported a $140,758 profit in July and $223,394 in August, when passenger load factors were averaging around 57 percent.

United Air Lines' route to Hawaii continues to be a top-notch money-maker. Operating profits of $73,621 in July and $92,630 in August more than wiped out a first half deficit of $119,506. Load factor on this link zoomed from 80 percent in July to 96.8 percent in August.

Transocean Signs Contract To "Organize" Carrier

Transocean Air Lines has signed a $1,000,000 contract with Pak Air, Ltd., to furnish the Pakistan carrier with planes, crews and technical personnel. Contract marks the second time that Transocean has helped a foreign airline to set up international operations. A similar operation was recently completed to perform work and provide personnel for Philippine Air Lines.

Agreement calls for delivery of four DC-4s, two DC-3s and the furnishing of crews to fly for Pak Air. Transocean also will assist in training Pak Air's flight and ground personnel. One DC-4 already has been delivered.

Public school teachers from all parts of Michigan flew this chartered Capital Airlines DC-4 from Grand Rapids to New York. As part of their study of air transportation facilities in the U. S., the teachers went on to take other carriers' chartered planes on protracted trips, some as far as the West Coast.

PCA Leads in Charter Business

Carrier builds up a bustling trade in contract traffic to help offset decreases in scheduled business.

Capital Airlines (PCA) is riding high as the nation's leader in drumming up business in planeload lots through charter sales.

Ranking sixth in total operating revenues among the 16 domestic trunklines last year, Capital was third in nonscheduled transportation income, placing behind American and TWA. Thus far in 1948, Capital occupies first place in charter receipts by a fairly wide margin.

Last year, Capital took in $217,211 from its contract and charter trips. During the first nine months of this year, the total was over $142,000, with the fourth quarter—always the peak period—expected to yield perhaps $150,000 more. Capital's increased nonscheduled business has been developed at a time when its own scheduled traffic, like that of the industry generally, has been below last year's levels.

▶ **Enterprise Shown**—While Capital's highly profitable charter activity will account for less than 2 percent of the company's total operating income in 1948, it is of major significance to a carrier striving to keep its losses at a minimum pending CAB review of its mail pay. The company's enterprise in luring new traffic points strongly to the presence of efficient management—a factor which CAB weighs carefully in setting mail rates.

J. O. (Bill) Urquhart, manager of Capital's special events section, says his major source of charter business is professional and collegiate athletic teams. Large industrial concerns also are big charter customers. Busy executives can attend conventions, sales sessions and directors' meetings at distant points with maximum convenience, minimum expense and no loss of time in chartered planes.

▶ **Customers Listed**—Among Urquhart's customers are General Motors, Ford, General Foods, Armstrong Cork, Westinghouse, Kaiser-Frazer, U. S. Rubber, Nash-Kelvinator, Atomic Energy Commission, Detroit Times, and the American Legion. Recent trips have been made as far as Aruba, Netherlands West Indies.

By happy coincidence, Capital's charter business builds up to its highest level when regular traffic is showing a normal seasonal decline. Equipment and personnel which otherwise might be idle are kept busy, especially over weekends.

October revenue from nonscheduled flights is expected to aggregate about $80,000—more than a quarter of Capital's total charter income this year. During the second weekend of the month, Capital made the following roundtrip DC-4 charter trips: Standard Oil Co. of New Jersey, Washington, D. C.-Texas; University of San Francisco football team, Chicago-Detroit; Duquesne University football team, Pittsburgh-Birmingham, Ala.; Clemson College football team, Anderson, S. C.-Starkville, Miss.; University of South Carolina football team, Columbia, S. C.-New Orleans; Wayne University football team, Detroit-Washington, D. C.; University of Richmond football team, Richmond, Va.-Greenville, S. C.; and the San Francisco 49ers professional football team, Erie, Pa.-Baltimore.

▶ **Rooter Business**—Urquhart is angling for "rooter" business as a natural concomitant of athletic team flights. Besides gridiron squads, he is doing business with professional and collegiate basketball, hockey and track teams.

Capital's charter rates are $2 a plane mile for DC-4s and $1 a plane mile for DC-3s. The carrier does not consider uncertificated nonscheduled operators important competitors for passenger charter traffic. Most potential customers Urquhart declares, prefer to do their business with the regular scheduled airlines.

While Capital leads the industry in domestic special flights, other airlines also are reporting increased business in the field.

• **Braniff**—Will fly five southwestern grid teams (Baylor, Texas, Oklahoma, Oklahoma City and Tulsa) to twelve games in nine states from coast to coast this season.

• **Continental**—Has contracted to carry 15 western college and university football teams to games as far away as Washington, D. C. Trips will be made with Convair-Liner and DC-3 equipment.

• **Pan American**—Carried the 52-man University of Miami football team to Detroit on Oct. 15 and the next day flew them to Washington, D. C., to scout the University of Maryland (one of its future opponents) in its game with Duke.

• **TWA**—Will fly five All American Football Conference teams 1,989,765 passenger miles and three National Football League squads 890,154 passenger miles this season. In addition, TWA will carry six university football squads to out-of-town games.

• **United**—Reports it will fly a record number of gridiron teams this fall. It has contracted to carry 13 major university squads on 17 roundtrips to all parts of the country.

Nonscheduled Transport Services Certificated Domestic Lines*

(First 7 Months, 1948)

Carrier	Revenue	Pass. Miles
Capital	$85,342	1,300,000
United	70,663	590,000
Western	62,506	986,000
Eastern	41,476	640,000
American	39,872	703,000
TWA	20,364	355,000
Northwest	16,680	530,000

** Industry "big five" plus Capital and Western. Note: Some contract cargo revenue included.*

Family Fare Plan A Success, Says AA

American Airlines' first-of-the-week family fare plan is going over with a bang, according to company sales officials.

Reservations personnel have been "deluged" with inquiries about the arrangement, which went in effect last month and is designed to increase load factors during normally slack periods. Under the plan, wives and children under 22 accompanied by full-paying passengers can travel at half fare if their flight starts between Monday and Wednesday.

▸ **Boston Results**—AA's Boston office reported that 50 persons daily took advantage of the plan the first week it was offered. During the second week the number of family-fare reservations jumped to 80 daily, and during the following two weeks the number reached about 100 daily.

Since the total number of persons traveling out of Boston on American averages around 800 daily, the family fare plan already is accounting for one-eighth of the reservations. Boston sales personnel have expectations that this ratio to increase.

▸ **Other Cities**—American's Los Angeles office reports that family plan reservations more than doubled during the second week of operation, with nearly 300 families taking advantage of the low rates. Between Sept. 13 and Oct. 13, AA's Cincinnati office booked 100 family plan parties of two, eight parties of three and two parties of four.

During the first four Mondays in which records of family plan bookings were kept, 105 persons took advantage of the arrangement at Cincinnati. As a result, usually poor Monday business increased 7 percent.

Ten Nations Finance Iceland Air Facilities

The International Civil Aviation Organization has announced an agreement whereby ten nations will finance air navigation facilities on Iceland starting next year. Estimated costs of $650,000 annually will be divided: U. S. 48.7 percent, Iceland 17.5 percent, Great Britain 9.9 percent, Canada 7.1 percent, Netherlands 4.9 percent, France 4.1 percent, Sweden 2.6 percent, Belgium 1.8 percent, Denmark 1.7 percent and Norway 1.7 percent.

Iceland will be paid about $1,000,000 for expenses incurred in maintaining air navigation facilities—including weather reporting and forecasting stations, area traffic control and telecommunications networks—from 1946 until the end of 1948.

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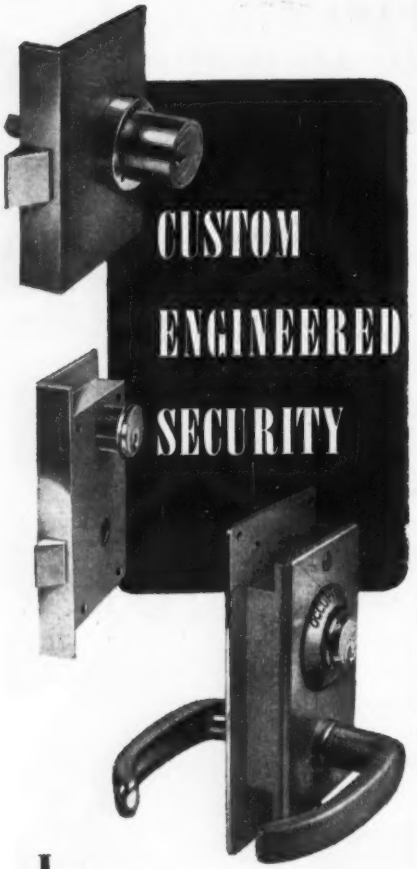

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CAB Again Rebuffs Nonskeds

Board rules out exemption to cover scheduled second-class service; Standard wins court victory over AA.

Uncertificated transcontinental sky-coach operators have taken another setback from CAB in their campaign for broadened operating privileges, but at the same time they have won an important legal skirmish in the federal courts.

The Board unanimously denied the petitions of Standard Air Lines, Viking Airlines, and Airline Transport Carriers for extension of their exemption authority as irregular operators to permit scheduled service (AVIATION WEEK, Aug. 9). CAB made clear that its decision should not be construed as a denial of need for coach-type operations. But it emphasized that proof of the need for scheduled second-class service should be developed through regular certificate proceedings, not through short-cut exemption petitions.

► **Misconception Seen** – The applications of the three sky-coach operators reveal an apparent misconception of the intent, purpose and interpretation of the nonscheduled exemption –a misconception which seems to be shared by a substantial number of carriers engaged in irregular services, CAB declared. The Board pointed out that the nonscheduled exemption permits common carrier transportation of persons and cargo only if no pattern of regularity is established between any two points.

"There is nothing in the Civil Aeronautics Act which empowers the Board to authorize air transportation without meeting the certificate requirements of the Act unless there is a direct showing that enforcement of the certificate provisions would be an undue burden on the carrier and contrary to the public interest," CAB continued.

"The legislative history of the exemption provisions of the Act indicates that its primary purpose is to provide relief for the sporadic services of the so-called fixed base operators and for carriers engaged in unusual or limited operations. There is nothing in the Act or its legislative history to justify the Board in bypassing or ignoring the certificate provisions of the Act by authorizing extensive new operations which, although involving some experimental characteristics, are neither unusual as to circumstances nor limited in extent.'

► **Board Irked**–Obviously irked by continued violation of its regulations, CAB said the undue burden on Standard, Viking and ATC which would result from denial of their bid for broadened exemptions would consist only of a requirement that they confine their operations to those authorized by their letters of registration.

"Inability of a carrier to launch extensive new operations which it believes would produce additional revenue is clearly not a sufficient showing of undue burden within the meaning of the Civil Aeronautics Act. Any operations conducted by these companies beyond those authorized by their irregular air carrier letters of registration are being conducted at their own risk of violating the Civil Aeronautics Act and the Board's regulations."

In requesting the broadened exemptions, the nonscheduled carriers had indicated they could not operate profitably if they complied with CAB's present regulations. Standard has admitted making over 1000 transcontinental trips with DC-3s in the past two and one-half years. CAB replied bluntly that if large transport-type aircraft cannot be used profitably under the nonscheduled exemption, either they should be retired from operation or a proper au-

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thorization should be obtained before regular services are undertaken.

"Carriers may not operate illegally on the ground of economic justification. It is clear that any other policy would produce immediate and complete regulatory chaos. If this principle is not followed, then by the same token a small certificated carrier having made an investment in a large number of aircraft, or in planes suitable for long-range operations, could encroach illegally on the routes of another certificated carrier on the ground of economic necessity."

▶ **Court Victory**—Meanwhile, Standard Air Lines won an important victory in the U. S. District Court for the Southern District of New York, where American Airlines had been seeking an injunction to restrain Standard from violations of the nonscheduled exemption. The court said it was without jurisdiction to grant American's relief.

"It was not intended by the Civil Aeronautics Act that the courts should undertake to determine whether or not one who holds a valid letter of registration as an irregular carrier has forfeited the right to operate as such," the presiding judge declared. "I can conceive of serious chaos and conflict with CAB if the courts were to do so."

▶ **Other Rulings**—Previously, courts in Hawaii and Alaska had accepted jurisdiction in similar cases and had granted injunctions against nonscheduled operators at the request of certificated airlines. CAB believes that if the New York decision is upheld it would bar access to the courts by certificated carriers seeking injunctive relief against unauthorized competitive services by irregular operators. Further, it may prevent court action by CAB prior to an administrative determination by the Board that the particular operation is, in fact, excessive.

Certificated carriers and CAB have sought injunctions against alleged violators of the nonscheduled exemption because court action is usually far faster than Board enforcement proceedings. The Standard decision perils action brought by CAB against Modern Air Transport in New York District Court and by American Airlines against Viking Airlines in New Jersey District Court.

▶ **IACA Meets**—CAB's order of Aug. 4 suspending Standard's letter of registration is still pending in the U. S. Circuit Court for the District of Columbia. Last week, the Board held a hearing on its own enforcement action against Standard.

Meetings between Independent Air Carrier Association representatives and CAA and CAB officials to seek constructive answers to economic and safety issues affecting large noncertificated operators were held last week.

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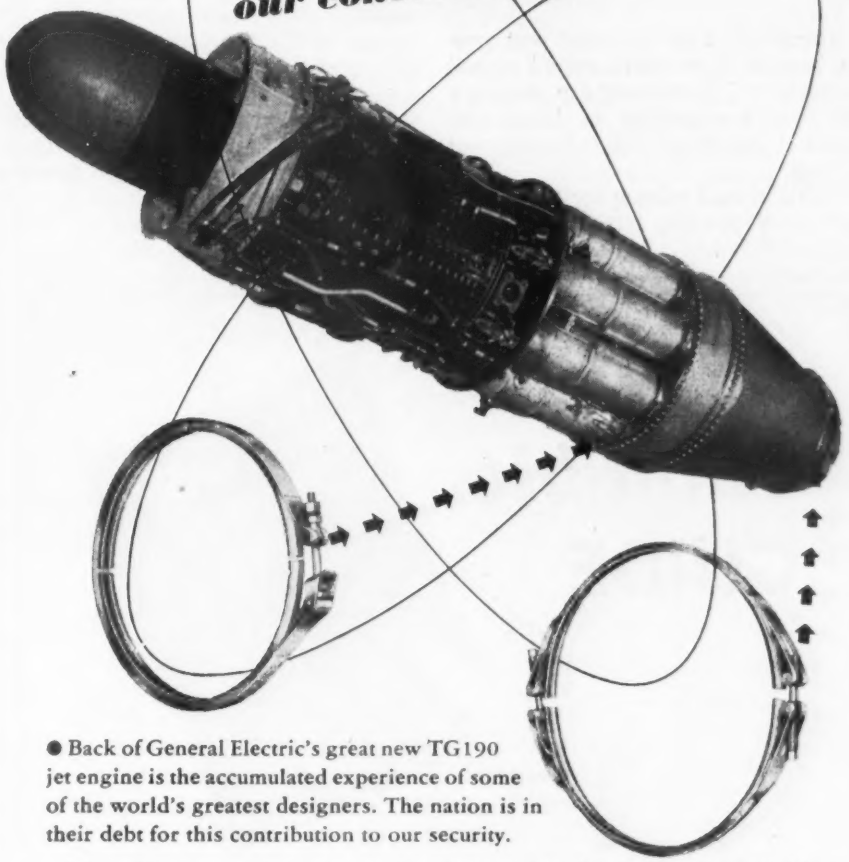

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Air Parcel Post

September debut of service boosts month's airmail volume 7 percent.

Inauguration of air parcel post service boosted September's overall airmail business by 7 percent—or approximately 516,500 lb.—according to latest estimates from Post Office Department officials.

Total airmail volume for the month was up 9 percent, hitting a two-year high of 8,284,101 lb., compared with August's volume of 7,560,556 lb. A small portion of the increase, Deputy Second Assistant Postmaster General Robert Burgess declared, was due to a rise in first-class airmail. Its volume has been on the upswing over the past year. (September, 1947, volume was 6,272,634 lb.—or 2,011,467 lb. below last month's level.) But approximately 70 percent of the September increase Burgess credited to new air parcel post business.

▶ **Disappointment Expressed**—Post Office officials were somewhat disappointed with the first month showing of the new service. It made no dent in surface parcel post volume, as hopefully anticipated. On the contrary, money-losing surface parcel post business continued to skyrocket. The Air Transport Association reported no noticeable falling off of air express traffic.

The 516,500-lb. September air parcel post volume is only a fraction of the ultimate target—50,000,000 lb. a month, or 10 percent of the 500,000,000-lb.-a-month surface parcel post volume.

▶ **Still Hopeful**—But both Post Office and ATA officials said the September showing was no indication of the air parcel post outlook. Business circles and the public generally were not aware of the new service and its advantages. Promotion had been slow in getting under way. The advertising campaign to promote parcel post is just now getting into full swing.

Post Office officials remain optimistic on the future. They expect the service to lure railway express business, as well as air express business, in the months to come.

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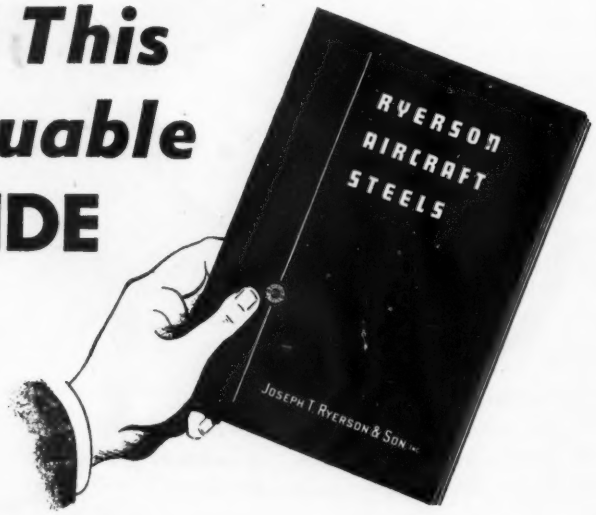

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ALASKAN AIRLIFT

Helping to keep Alaskan larders stocked during the West Coast maritime strike, Pan American Airways recently flew this DC-4 into Fairbanks with seven tons of fresh food. The grocery special carried eggs, milk, meat, and produce. PAA said demands of Alaska and Hawaii for food, medicine and other vital supplies were being met despite the walkout which has tied up Pacific Coast ports since the first week of September. Last month, Pan American flew 550,000 lb. of cargo into Alaska and added 20 extra sections to its normal schedules. Flights to Hawaii also were increased. The Independent Air Carriers Conference, consisting of nonscheduled operators with a total of 28 planes in Alaskan service, was flying from 30,000 to 40,000 lb. of freight northbound each day by the first of this month and reported cargo shipments had increased three-fold since the strike began. Alaska Airlines, which has four DC-4s and five C-46s, was hauling 40,000 lb. daily to the territory by early October.

Runways Unharmed By Jet Exhausts

Airport builders may have one less problem than they think. In the last few years, increasingly heavy civil aircraft have required runways to be lengthened and strengthened. A few months ago, confronted with discussion and progress on the advent of jet-propelled civil aircraft, airport builders and engineers were worrying a new problem: Would the heat from jet exhausts be harmful to conventional forms of airport runway surfaces?

Now the airport division of the American Road Builders' Association, after studying the shape of paths of such heat and the intensity of temperatures at different levels above runway surfaces, has come up with an encouraging answer.

ARBA shows that while temperature of jet heat emitted from current type jet air craft is 752 deg. F. at the outlet of tailpipes, it diminishes rapidly to 122 deg. F. two feet above and below where the heat emerges from tailpipe nozzles. However, the temperature climbs again to 167 deg. F. at a distance three feet above and below tailpipe nozzles at a point 26 ft. in back of them.

▶**Harmless Heat**—Says ARBA: "Inasmuch as the temperature which is generated on the surface . . . from the sun is frequently as high as 140 deg. F., it can be seen that the temperature of jet heat . . . is of such low magnitude as to be harmless."

But, it adds, the effect of jet fuel spilled on certain portions of airfield pavements is harmful.

The Air Force already knows this. Experts from the Corps of Engineers have made provisions to protect surfaces of currently operating airports from the damaging effect of jet fuel.

Whether airports now under construction should make provisions for this pavement hazard is answered by Whitman, Requardt-Greiner Co. and Associates, engineers handling the pavements at Baltimore's Friendship International Airport, currently undergoing construction.

In a report to Baltimore City's Department of Aviation, it said:

"A spillage of fuel occurs in fueling operations on all types of aircraft, having some detrimental effect on both asphaltic and Portland cement types of pavement. In addition, jet aircraft eject some fuel when ignition is delayed during starting. The heavier fuel used in jet operations seems to affect the pavements more rapidly than the high octane gases used . . . today because it evaporates more slowly. The solvent . . . causes a stripping action on the aggregates of asphaltic concrete and a softening and dissolving of joint material in Portland cement concrete."

▶**No Present Danger**—Conclude the engineers: "It was considered unlikely that commercial airlines would use jet-powered aircraft for a number of years. . . . It was felt that protective surfacing could be applied at such times as may become necessary either in the form of additional thickness to increase the load-carrying ability or as part of an ordinary maintenance surfacing."

Brightest spot in the picture is the categorical statement from designers and manufacturers of jet engines that foreseeable technological developments will prevent fuel spillage in aircraft of the future.

Tudor IV Crash Unsolved

Disappearance of a British South American Airways Tudor IV transport between the Azores and Bermuda last January must remain an unsolved mystery, according to the report of a Court of Investigation appointed by the British Ministry of Civil Aviation. No distress signals were received from the plane, which carried 31 persons, including Air Marshal Sir Arthur Coningham.

Court of Investigation said there are no grounds for supposing there were technical errors or omissions in the design of Tudor IV airplanes.

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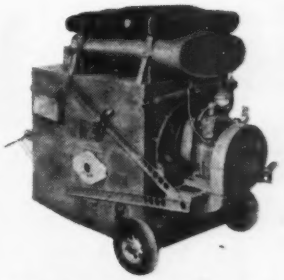

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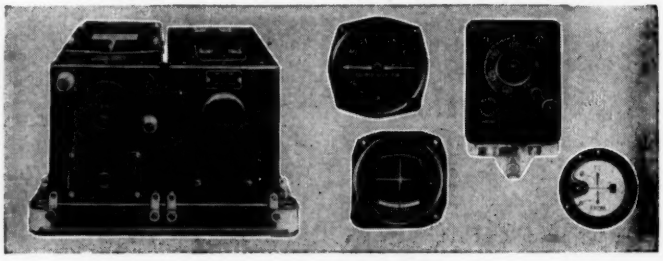

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Trans-Australia Loss

(McGraw-Hill World News)

MELBOURNE—The Commonwealth-owned Trans-Australia Airlines had a loss of $962,000 in the year ended June 30 last. This was less than half TAA's deficit in 1946-47, its first year of operation. Mileage flown increased by 250 percent and revenue nearly trebled to about $10,000,000.

Private airline operators have so far managed to keep on the black side of the ledger. Ansett Transport Industries Ltd., by diversifying its income sources, has chalked up a new record profit of $310,000. Ansett operates the second-largest private airline in addition to bus services, tourist hotels and bus-building plants.

SHORTLINES

▶ **Air-India**—Reports a $280,000 profit during 1947. Company's fleet now consists of eight British Vikings and 13 DC-3s.

▶ **Amphibian Air Transport**—Recently suspended its service between Long Beach, Calif., and Catalina Island.

▶ **Capital**—Company's unique direct mail advertising has been selected as the best in the industry by the Direct Mail Advertising Association. Capital keeps tabs on conventions and other meetings on its routes, mailing post cards to prospective delegates several weeks before the gatherings and suggesting they travel by air. Messages on the cards are keyed to each convention. In the ten months ended June 30 the carrier had a 14.7 percent return on its mailings in the form of plane reservations. It obtained $3221 worth of business from $27 worth of post cards.

▶ **New England Air Express**—Is acquiring another plane to replace the DC-3 which recently made a forced landing on the beach of Great Harbor Key near Nassau, Bahamas, while en route from Teterboro, N. J., to Miami and San Juan, Puerto Rico, with 19 passengers.

▶ **Northwest**—President Croil Hunter states that certification of Pan American Airways for a Pacific Northwest-Hawaii route will have no effect on NWA's plans for inaugurating service on the link by early winter. NWA was authorized to fly the route last July; by direct order of President Truman, PAA also was certificated on the run early this month.

▶ **Pan American**—Has inaugurated Convair-Liner service between Miami and San Juan, P. R. . . . Passenger traffic on

PAA's Pacific-Alaska division gained 35 percent in the first six months of 1948 over the same period last year.

▶ **Peruvian International**—Reports flying 24,800,000 revenue passenger miles and 1,448,000 ton miles of mail and cargo during its first year of scheduled operation between New York and South America. Company said it completed 97.3 percent of all scheduled flights, of which 95.4 percent were on time or within 15 minutes of schedule.

▶ **Piedmont**—President T. H. Davis states that profits during July, August and September enabled the feeder more than to offset deficits incurred the first few months after regular service was inaugurated last February.

▶ **Robinson**—Will open service between Ithaca and Albany, N. Y., next month. . . . W. R. R. Winans has been named sales manager.

▶ **Transocean**—Douglass F. Johnson has become vice president in charge of sales.

▶ **Western**—Airfreight volume increased 49 percent in the first eight months of this year over the same 1947 period.

▶ **Wisconsin Central**—Has been offered a higher mail rate by CAB for past and future periods. . . . Company is installing VHF communications equipment throughout its system. . . . Service to Green Bay, Wis., was inaugurated this month.

CAB SCHEDULE

Oct. 25—Hearing in U. S.-Alaska service case. (Docket 3286, et al.)

Oct. 25—Oral argument in Latin American route amendment case. (Docket 2811, et al.)

Oct. 26—Hearing on sale of portion of Western Air Lines' route 13. (Docket 3440.)

Oct. 27—Prehearing conference on TWA's complaint against Pan American Airways involving flights to Saudi Arabia. (Docket 3264.)

Nov. 1—Second perhearing conference in southern transcontinental route case. (Docket 1102, et al.)

Nov. 8—Prehearing conference on proposed suspension of Nats Air Transportation Service's letter of registration as a nonscheduled operator. (Docket 3456.)

Nov. 29—Hearing in New England states service case. (Docket 2196, et al.)

Nov. 29—Hearing in airfreight tariff case. (Docket 1705, et al.)

Dec. 8—Hearing on Pan American Airways' Guatemala City-Los Angeles/San Francisco route case. (Docket 3277.)

Dec. 13—Hearing in TWA route consolidation case. (Docket 2581, et al.)

Dec. 15—Hearing on Board's enforcement proceeding against Transocean Air Lines. (Docket 3244.)

Jan. 5—Hearing on additional service to Puerto Rico. (Docket 2123, et al.)

Jan. 15—Hearing on need for equipment interchange agreements providing through service at St. Louis and Memphis. (Docket 3426.)

Feb. 16—Hearing in reopened Mississippi Valley and Southeastern States cases. (Dockets 548 and 501, et al.)

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STRICTLY PERSONAL

A STRATOCRUISERS AND YOU—Al Hill's Boeing news bureau didn't tell us, but Boeing missed a golden opportunity the other day to donate the prize to end all prizes on a radio giveaway show, a Stratocruiser.

Miss Bluma Goodson, enterprising merchandising director for the program, "Stop the Music," extended the opportunity.

"You can put your airplane into our jackpot and receive a description and an additional plug per show, for no other cost to you than your airplane," she wrote **Harold Mansfield,** director of Boeing public relations and advertising. "You will receive two name impressions per program as long as our jackpot holds out—which is until our new mystery melody is cracked. We can't say exactly how long this will be, but a conservative average is five weeks. Five weeks—at two mentions per show—on the top rating participation show in America is worth in cash terms a good $75,000 in hard circulation."

Carl Cleveland, advertising manager, replied that the winner might be a bit taken aback to find he had won a plane requiring a crew of five and a lot of storage space. He also doubted wisdom of giving away an airplane worth $1,500,000 in exchange for $75,000 worth of advertising time.

* * *

BUY AMERICAN—C. R. Smith was no more than elected president of Air Force Association when American Airlines influence began protruding all over the recent AFA convention. At the night session, before a packed Madison Square Garden, **Bob Hope** appeared, accompanied by Broadway star **June Lockhart,** who was in AA stewardess garb. Hope apologized. Said she had to wear the AA suit or they wouldn't get a seat back to Hollywood. TWA and UAL representatives present let him get away with the plug.

* * *

SYMINGTON BARES A SHORT TANGLE—We never get around to reporting another intimate detail of the AFA convention. **Secretary Symington,** featured luncheon speaker, revealed dramatically that there had been one short and snappy unification battle in Washington the newspapers barely covered. It was fought by the Air Force and the Quartermaster Corps over the official color of Air Force underwear. The situation has been cleaned up, however. Pointing to the multitude of Air Force brass scattered around the Commodore Hotel banquet hall, the Secretary of the Air Force pronounced proudly: "I can assure you that every Air Force man here today is wearing white underwear."

* * *

SORRY, NO SARI—Joe Van Denburg, who was AVIATION NEWS' copy chief before he became McGraw-Hill's correspondent in India, flashes that Air-India International has dropped its plan to dress its hostesses in the flowing Indian sari as an advertising stunt. Even the exotic Indians were compelled to decide that five yards of exquisitely draped georgette didn't go well with tending to passengers at 10,000 ft. So the nippy short-skirt outfits designed in conjunction with TWA are standard again, Joe says.

* * *

BILLBOARD BACKFIRES—Bob Boylan, formerly of Parks and now with Gardner Advertising Co., in Washington, says the other day ALPA's skywriting pilot over National Airport was sure embarrassed. The pilot was just putting the finishing touches on "Don't Fly National Airlines," a five mile billboard, when the first word blew away and left a big ad up there. So the pilot got wise and just began writing "Scab" like crazy after that, whenever a National plane was on the apron. (Bob recently married Margaret Kerr, of Northeast Airlines' publicity staff, after a whirlwind three months courtship which began at the Aviation Writers Assn. convention).

* * *

BITS ABOUT PEOPLE—Fowler (Sam) Barker has returned to these shores and is back at 7 Midland Gardens, Bronxville, N. Y. . . . **Thomas J. Deegan, Jr.,** formerly public relations chief for American Airlines, has been named president of the Federation of Railway Progress. He joined Robert R. Young's staff in 1946 and became director of public relations for C. & O. later . . . **John L. Foy,** pre-war advertising manager of American Aviation, is now assistant general manager for Dayton Daily News . . . Wish **Bevo Howard** would abandon aerobatics. We hold a check for $1,000 which **Al Lodwick** made out over a year ago on behalf of Bevo's friends. It reads—"Pay to the order of Beverly Howard, when he promises to stop acrobatics." Al, incidentally, is reported recovering from a serious illness.

R. H. W.

WHAT'S NEW

New Literature

"London Airport," published by British Information Services, 30 Rockefeller Plaza, New York 20, paper covered booklet which tells the story of the airport, and the airlines and airplanes which operate there. 40 pages, price 35 cents.

"Industrial Safety, Publications and Materials," a service guide issued by the National Safety Council, 20 N. Wacker Drive, Chicago, Ill., contains illustrated index of safety materials available for plants and personal and cost of each.

"Ryerson Tubing Service," 32-page bulletin containing information on seamless and welded carbon steel tubing, stainless tubing and pipe, structural tubing and seamless and welded boiler tubes. Available without charge from Joseph T. Ryerson & Son, Inc., PO Box 8000-A, Chicago 80, Ill.

"Official Papers on Air Terminal Development, Finance and Service," papers delivered at the first meeting of the Airport Operators Council, this year in Boston. Statements from leading air transport officials. Bound 114-page copies available prepaid at $1.75 each from Airport Operators Council, 1625 K Street, N. W., Washington 6, D. C.

New Books

"High-Speed Aerodynamics," by Harold W. Sibert, professor of aeronautical engineering at the University of Colorado. This text book for undergraduates comprises 283 pages, including twelve pages of charts and tables. Prentice-Hall, Inc., 70 Fifth Avenue, New York. $6.

"Airline Operation," by R. Dixon Speas, assistant to the vice president-engineering of American Airlines. Fifteen chapters, illustrated, cover: Historical summary, airline organization, aircraft and engines in airline operations, operating costs and revenues, aircraft utilization and on-time operation, fundamentals of flight and performance; takeoff, climb and ceiling performance; cruise control methods for efficient operation, fuel load requirements, airplane weight and balance problems, aircraft maintenance and engineering, communications and meteorology, airports and airways, passenger service, cargo operations. A list of questions on each chapter is included at the end of the book, for classroom use. American Aviation Publications, 1025 Vermont Ave., N.W., Washington, D. C. $5.

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LETTERS

ATC Replies on Commissions

(This letter was written to Arthur R. Boreman, Publisher of the Merchants Trade Journal, Des Moines, Ia.)

I have before me your letter to the Editor of AVIATION WEEK which appeared in the issue of Oct. 11, under the heading, "Commissions for Fixed Basers." In that letter you ask the editor to take up the cudgels in connection with such a project.

In your letter you state that "The Air Transport Association puts fixed base operators in the same category as hotel porters when it comes to paying them a commission for developing air travel."

I must state that nothing could be further from the truth. As a matter of fact, more than a year ago the Air Traffic Conference, the Traffic Division of the Air Transport Association, adopted a resolution which made it possible for the airlines to employ as commission agents any person whatever, engaged in any type of business, located in small or feeder type cities or towns who were not served by trunk line carriers or where regular long-established travel agencies are not located, so that the persons so employed would be in a position to develop business for the airlines on a special basis. The airlines do not categorize fixed base operators and, as a matter of fact, we have just recently, in cooperation with the National Aviation Trades Association, furnished the airlines with complete copies of lists of fixed base operators in small communities so that proper contacts could be made with them for the express purpose of developing business both for the airlines and for the fixed base operators.

I have personally discussed this matter with officials of NAA and officials of NATA and it was my opinion that everyone interested understood the airline position in this matter and that it could not be charged that the airlines were overlooking a very potent source of new business.

It was recognized that in the smaller communities of 5000 to 25,000 population there are many fixed base operators who could represent the airlines admirably and where they could engage in such activity without competition from other recognized sellers of transportation.

I regret indeed that the situation as outlined above has not previously been explained to you.

M. F. REDFERN,
Vice president—traffic; Secretary
Air Traffic Conference of America
Washington 6, D. C.

Another Pilot's View

I read the Sept. 27 AVIATION WEEK with the usual interest I have in your magazine. I am a National Airlines pilot on strike and the chairman of Council 73 (Miami) Air Line Pilots Association. Naturally your editorial of Scab Johnson's welcome rubbed me the wrong way as you reprinted something that came from a notoriously anti-labor newspaper. Just to show you another view of the same scene, I'm enclosing an editorial from a local Labor newspaper.

Your fairness in the past in being impartial in your reporting has lead airline pilots throughout the industry to cancel subscriptions in another aviation magazine and to order AVIATION WEEK. I believe you will continue your policy.

D. E. BURCH,
Chairman, Council No. 73
Air Line Pilots Association
Miami, Florida

The editorial, from the Union Record—WELCOME HOME FOR HERO OR HEEL?

The Miami Branch of the Air Line Pilots Association (AFL), took advantage of an excellent opportunity to publicize its strike against National Airlines when a welcome home celebration was given Anson Johnson, Thompson trophy winner at the Cleveland air races.

The racer is employed as a scab pilot by National. He is one of approximately 100 scabs helping National in its efforts to break the ALPA strike.

The proposed celebration was originally to have been backed by the Miami Springs City Council. However, when storms of protest from labor men throughout Miami came flooding in, the council voted against sponsoring the affair. Many of the council's officers participated in the ceremony, though, in what they termed an "unofficial capacity."

More than 200 striking pilots and their families formed a three block long line at the celebration, carrying placards relating that the strike was still on and distributing 5000 pamphlets.

Local radio stations and newspapers commented rather caustically on the "labor rancor" at the celebration. They all failed to take into consideration that instead of trying to "detract the glory from Johnson," the union merely was trying to inform the public that the strike has not yet been settled.

The Association revealed that many people thought the strike was settled when the Presidential fact finding board found that the company was "in the wrong." They were not aware that NAL refused to accept these findings.

A spokesman for the ALPA reported that the strategy of the move in having the pickets at the homecoming celebration was "100 percent successful."

Of the 100 scabs at National, only 11 were employed at the time the strike was called, and of this number, six were at the very bottom of the seniority list. It is obvious that these men refused to honor the picket lines for purely personal advancement. Of the 130 striking pilots, more than 60 are combat veterans of World War II with flying time for NAL ranging from 4000 to 12,000 hours.

While it is undoubtedly an honor that Johnson won the Thompson trophy, no true labor man can admire him because of his scabbing activities. Nevertheless, whether some people admire him or not is inconsequential. The celebration for the "hero or heel" served its strategic purpose for the ALPA and made the public realize that the pilots' strike is not over.

Stall Warnings

The Safe Flight Instrument Corp. has queried 500 registered users of the Safe Flight Indicator for comments on stall instrumentation. Since your espousal of the idea of stall instrumentation has, in my estimation, been largely responsible for its acceptance, I am sure you will be gratified to know that 60 percent of those replying said that they had an unexpected warning which may have saved them from an accident.

Those who definitely stated that the SFI had averted an accident were asked to submit details, and we now have over 30 detailed replies. This is probably the first set of reports available on "accidents that didn't happen."

WILLIAM D. STROHMEIER
Strohmeier Associates
55 West 42nd St.
New York, N. Y.

British Did It First

We have read with great interest the recent correspondence regarding early deck-landing trials with jet aircraft. On Dec. 3, 1945, a de Havilland Vampire (de Havilland Goblin engine) made a series of 15 take-offs and landings on the Light Fleet carrier H. M. S. Ocean. This was the first occasion on which a jet aircraft had landed and taken off from a ship at sea.

M. SHARP, Public Relations Officer
De Havilland Aircraft Co. Ltd.
Hatfield, Hertfordshire

Takeoff Dolly

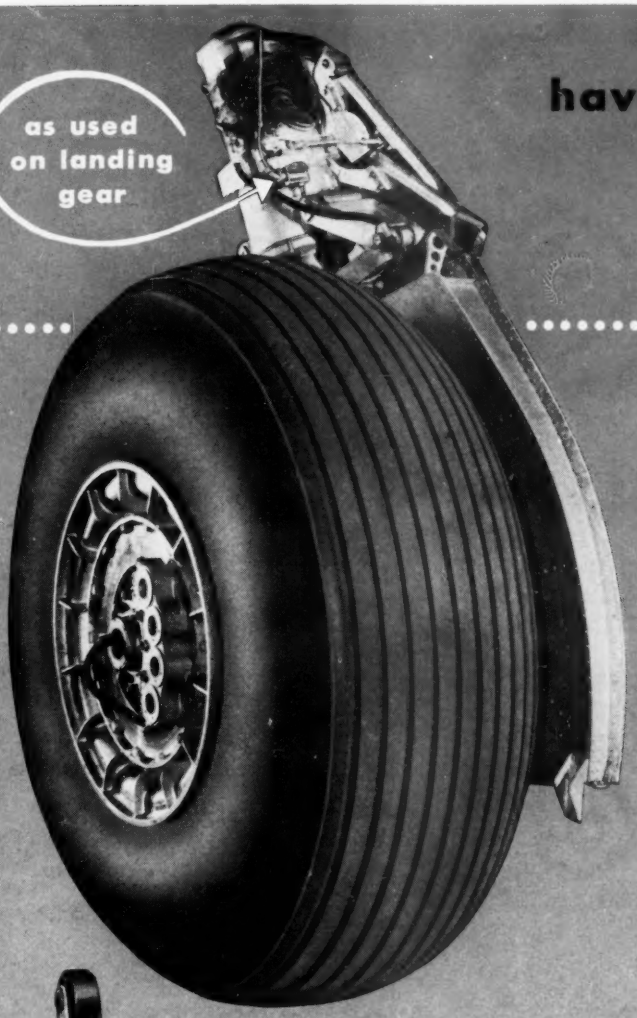
Your report of the takeoff dolly June 7 brought to mind a similar device which some of us used successfully prior to World War I—the use of a handcar on a straight railroad track for takeoffs after forced landings in rough country.

Robert C. Fowler, who made the second U. S. transcontinental flight, started from Jacksonville, and flew to San Francisco during January-June, 1912, using a Model B Wright. The handcar method of takeoff was used several times. Possibly the fact that our Wrights only required an air speed of about 38 mph. to take off contributed to the success of this method.

HARRY D. COPLAND
Assistant to Regional Administrator
Civil Aeronautics Administration
Atlanta, Ga.

MICRO *Precision Switches*

as used on landing gear



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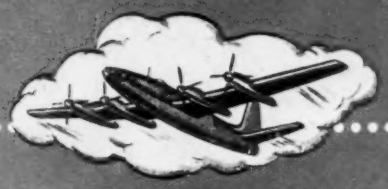
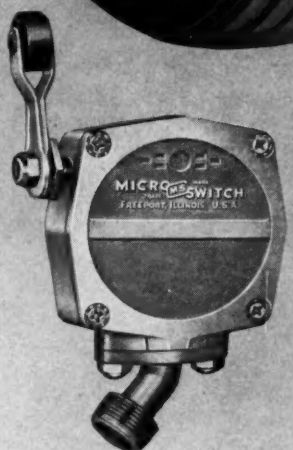


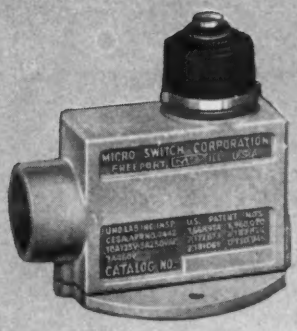
• MICRO precision switches fulfill rigid requirements in electrical controls in landing gear mechanism. They prevent accidental retraction of landing gear, while weight of plane is on gear . . . they act as interlocks between landing gear and throttle warning horn . . . they prevent gun firing when wheels are down . . . they operate indicator light which shows wheels are locked in "down" position. This represents but a few of their many uses in the aircraft field.

MICRO precision switches are available in a complete line with a wide range of shapes, sizes and actuators, all with high electrical capacity. All have the DEPENDABILITY so necessary for aircraft use.

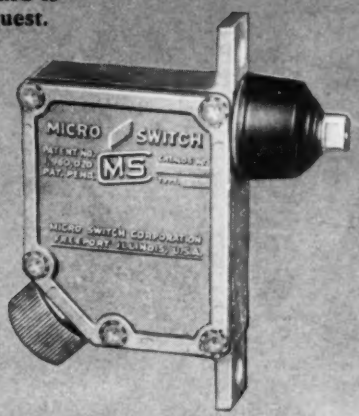
MICRO engineers have valuable experience in the application of MICRO precision switches to meet many switch problems. They, in many cases where volume warrants, can change switch characteristics so that you have a "tailor made" switch for your specific use. This engineering aid is available upon request.



MICRO LMR switch has a die cast aluminum housing with mounting holes for four position mounting on either face. Rotary lever arm actuator is adjustable through 360°. Total travel of roller arm is 90° in either direction. AN number 3233.



MICRO die cast enclosed switch is compact. It combines ruggedness with light weight and has high electrical capacity. It is used on military and commercial aircraft.



MICRO Type "HN" switches provide a light-weight, compact, high capacity electrical switch with long life expectancy. "HN" housings are light weight, die-cast aluminum.

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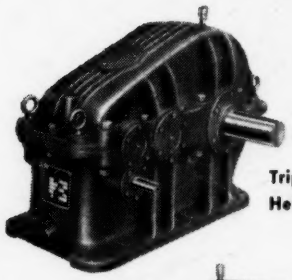

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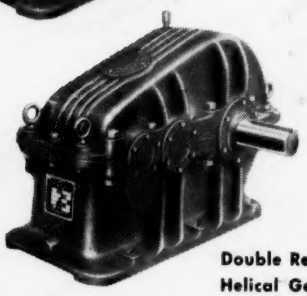
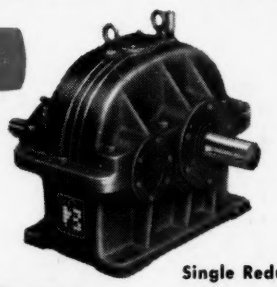


Double Reduction Helical Gear Unit



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